November 30, 1929 *A McGraw-Hill Publication* 20 Cents per Copy

AVIATION

The Oldest American Aeronautical Magazine

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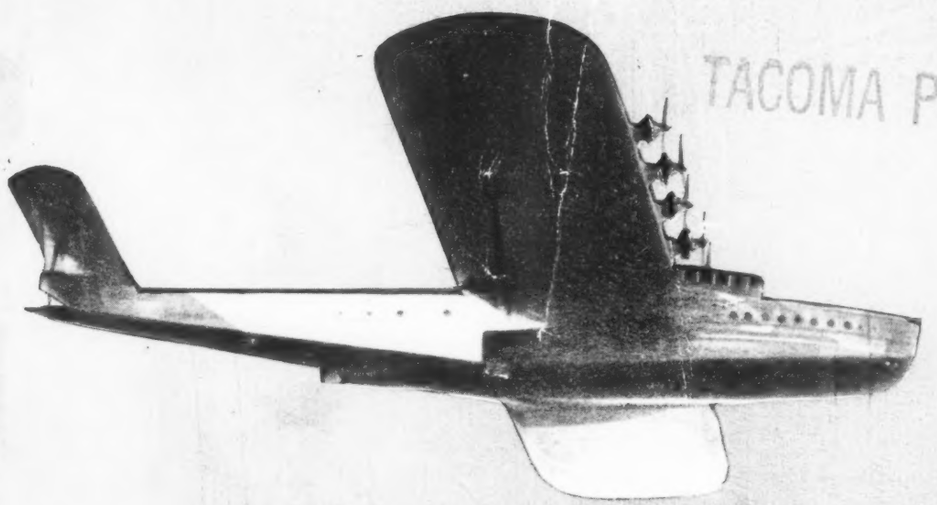
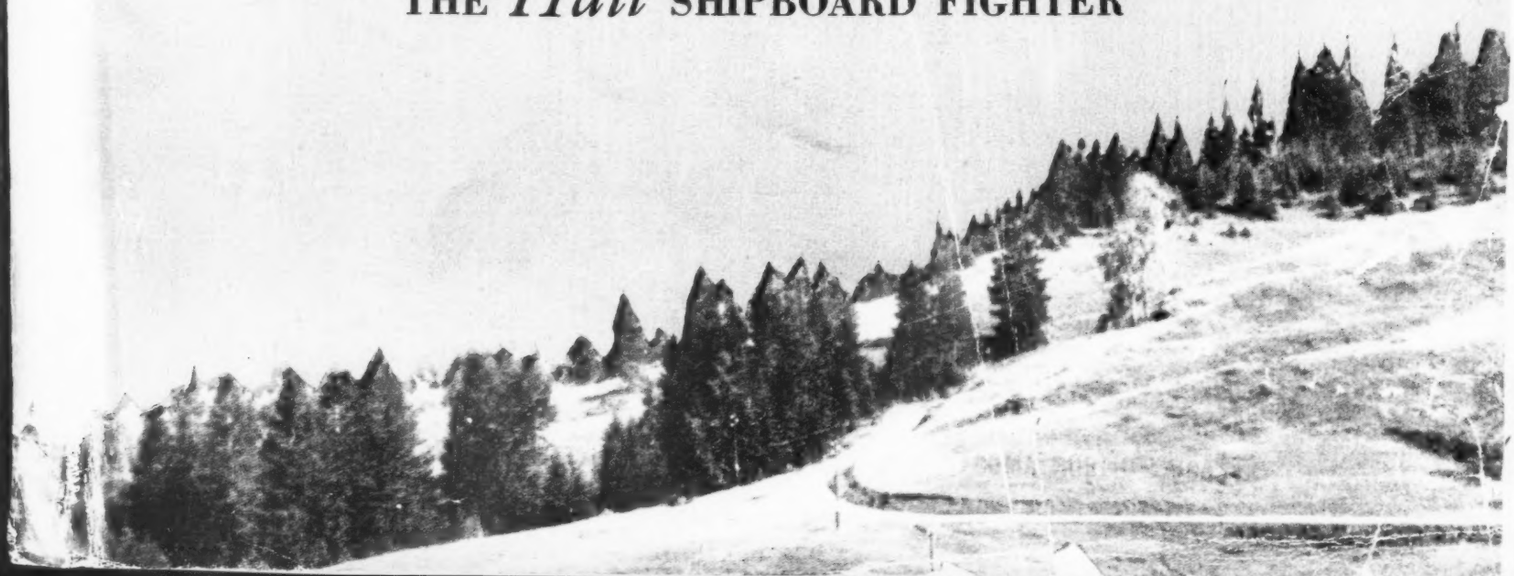
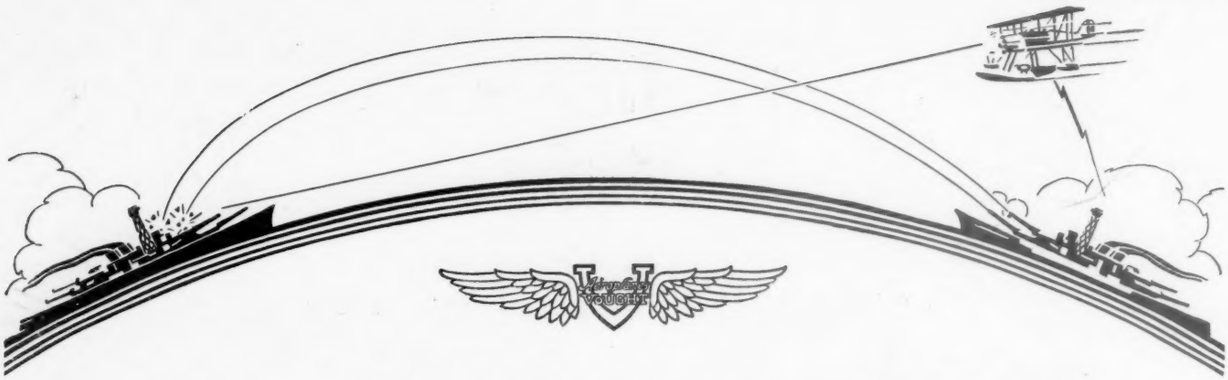


THE *Western Show* AND *Airport Conference*

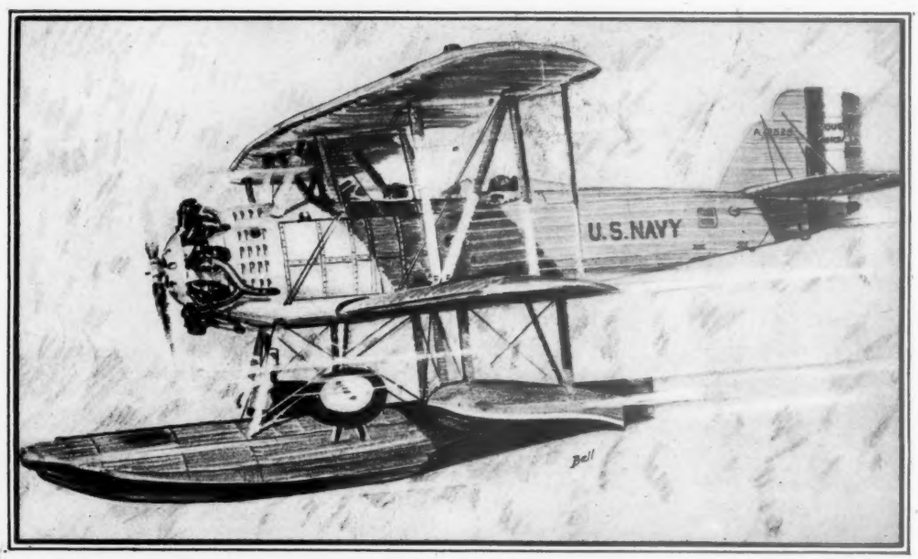
BALANCING *Weight* AND *Costs* IN MATERIALS

THE *Hall* SHIPBOARD FIGHTER





The "Corsair"...the eyes of the Navy



The "Corsair" with its 425 H. P. "Wasp" engine adapted as a high performance amphibion for the aircraft carriers of the Navy

MODERN problems in naval gunfire involve tremendous ranges. As the standardized observation plane of the Navy the "Corsair" has enabled spotters to increase their vision far beyond that afforded from the "tops." It has proved its worth with thousands of hours of satisfactory service.

The utility of the "Corsair" has been further extended by the addition of amphibion gear. Thus equipped it can be launched from a battleship catapult, landed on the deck of a carrier, on the sea or at a shore station.

The strains set up by catapult launching and quick stopping aboard a carrier require safety factors far in excess of those used on any other type of ship. When the "Corsair" goes into civil life for sports or business use it provides the same margins of performance and dependability which characterize its naval and military operation.

CHANCE VOUGHT CORPORATION

DIVISION OF UNITED AIRCRAFT & TRANSPORT CORPORATION

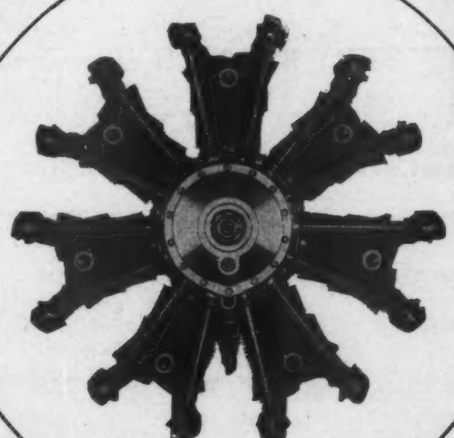
Long Island City, New York

AVIATION. November 30, 1929. Vol. No. 27, No. 22. Published weekly. McGraw-Hill Publishing Company, Inc., Tenth Avenue at 36th Street, New York, N. Y. Domestic $4.00 per year, Canada $5.00. All other countries $6.00; 20 cents a copy. Entered as second-class matter July 27, 1928, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

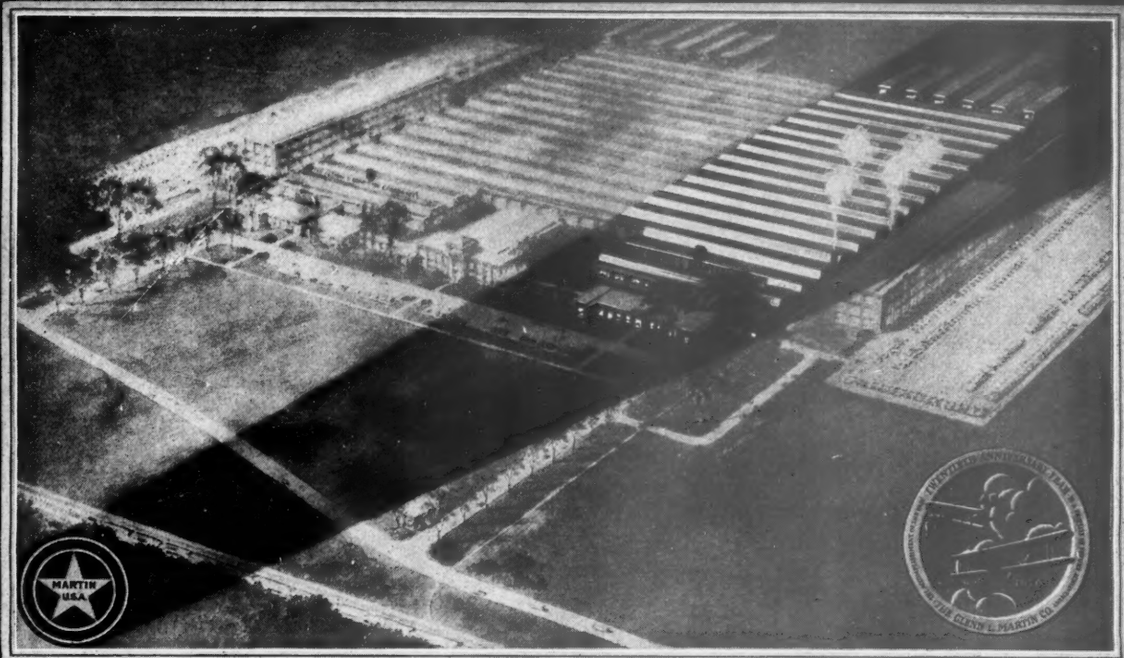
BUILT UNDER ONE ROOF

The ARGO
DEPARTMENT OF COMMERCE CERTIFICATE NUMBER 178

The HESS-WARRIOR
DEPARTMENT OF COMMERCE CERTIFICATE NUMBER 24

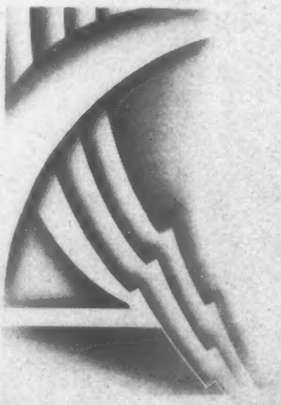


The ALLIANCE AIRCRAFT CORPORATION
MANUFACTURERS of AIRPLANES — AIRPLANE ENGINES
ALLIANCE, OHIO.



A FUTURE
"Capitol of Aeronautics"
IN THE MAKING

EVERY BRANCH of aeronautics is provided for in the plans for the new Glenn L. Martin airport and plant now taking form at Middle River, on the outskirts of Baltimore. There will be laboratories for the engineer, shops for the artisan, a school for the student with courses covering both design and flying, a residence colony with hydroplane landing for the amateur, and a hotel, restaurant and camp for interested visitors.



The* GLENN L. MARTIN *Co.
Builders of Quality Aircraft since 1909
BALTIMORE, MARYLAND

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ELIMINATE faulty lubrication and you do away with an important cause of engine failure. On many miles of airways -TP- Aero Motor Lubricating Oil keeps the engines running smoothly—helps to deliver the mails on time.

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This process has marked advantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

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A handsome, practical *Pilot's Log Book* sent free on request.

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three *vital* factors in

Du Pont *Aircraft Finishes lend inestimable aid in airplane styling*

NO longer can the aircraft maker depend exclusively on mechanical superiority for competitive sales success. As aeronautics progress, all planes—all models—approach each other, more and more closely, in structural perfection. Today, *style* plays a leading part in aircraft merchandising.

To aid the aeroplane manufacturer in achieving modern styling in his ships, du Pont now offers a complete line of aircraft finishes. Wing dopes, primers, Aircraft Enamels, Army and Navy Finishing materials and many other products are available in their highest stage of modern development. Beautiful in texture, ultra-modern in tone and color, and specially formulated for air service—they bring you significant advantages in competitive selling.

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Complete information on any du Pont product for airplane use will be furnished either by mail or by a qualified representative.

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Du Pont Dopes—The du Pont line of aircraft finishing materials includes clear, semi-pigmented and pigmented dopes. They are all tested formulas of remarkable durability—proven in service as well as in the laboratory. Flexible and highly blush-resistant, the Army and the Navy have approved these products for their requirements. Available in a wide variety of highly visible colors.

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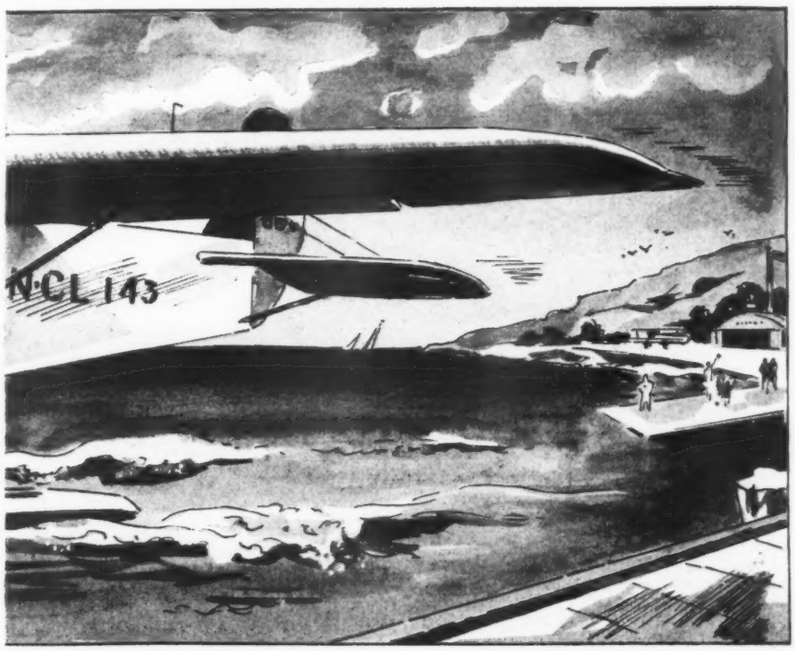

your aircraft sales

Du Pont Pyralin and Fabrikoid adapt themselves to countless aircraft luxuries and refinements

IN the styling of modern planes, du Pont Pyralin and Fabrikoid offer almost unlimited possibilities. Extremely light, ideally durable, and beautiful in the most modern sense, these materials fulfill every requirement of air service.

Pyralin in various colors and effects provides transparent cabin windows, instrument boards and wing lights of smart appearance and utmost serviceability. Complete information and its many present uses will be furnished on request.

Fabrikoid completely modernizes cabin linings and upholstery. Its lightness and toughness make it highly practical for the air. And the designs of the new Nemoursa Aercplane Fabrics express vividly the buoyancy and gaiety appropriate to modern air transportation.

Du Pont technical men will gladly cooperate in applying these materials to style your planes. Please write direct to the division concerned.

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Du Pont Fabrikoid—Sturdy Fabrikoid is an ideal material for open cockpit upholstery. Will withstand varying weather conditions. Nemoursa Aeroplane Fabrics are new type, light-weight materials developed for interior trims of cabin ships. Made on a high-grade woven cotton base and treated with appropriate pyroxylin colors. Embossed in distinctive patterns.

Du Pont Pyralin—A strong, durable, light, unbreakable, transparent material furnished in any gauge from 5-1000 upward in sheets approximately 20 in. x 50 in. Ideal for windshields, cabin windows, running lights and other uses.

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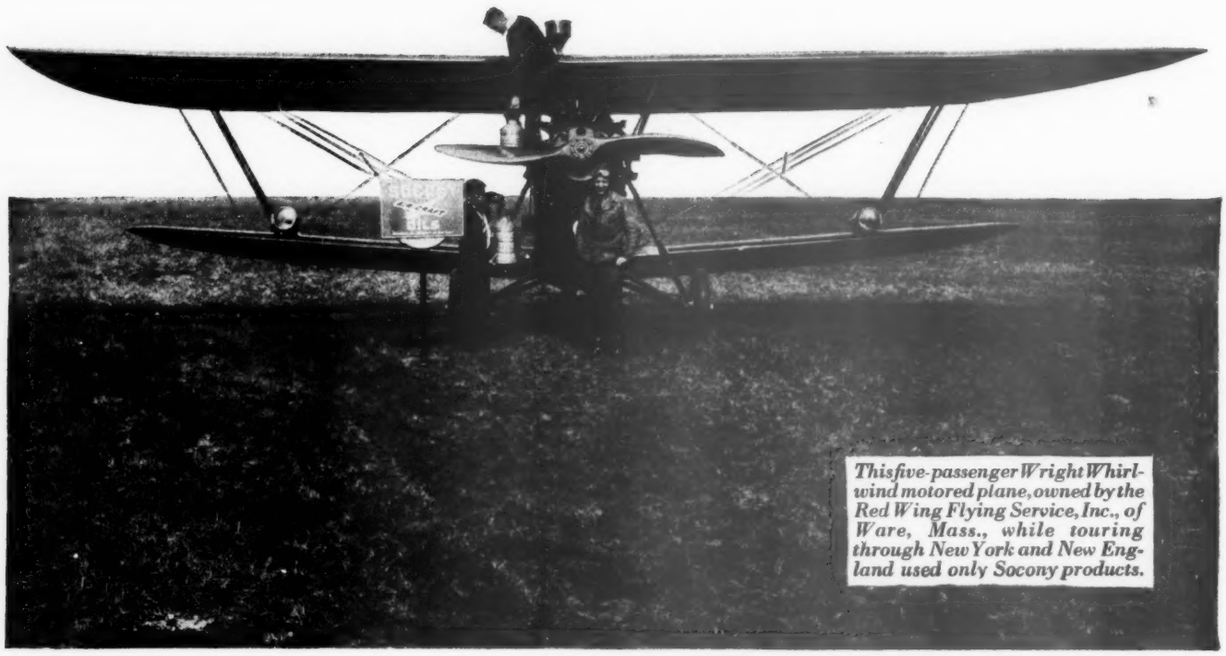
TRIED *the* OTHERS
Now uses Socony



This five-passenger Wright Whirlwind motored plane, owned by the Red Wing Flying Service, Inc., of Ware, Mass., while touring through New York and New England used only Socony products.

"WE have tried numerous aviation gasolines and oils," said Roy Ahearn, chief pilot of the Red Wing Flying Service, Inc., of Ware, Mass., "but we have always come back to Socony products. Our advance purchasing man has orders to buy only Socony in New York and New England."

This is the opinion of a crack pilot who has had more than four thousand hours of flying to his credit, and is a member of the famous Caterpillar Club.

Before using Socony Aircraft Oil, Ahearn put it to a severe test. The plane was flown for twenty hours with an average of five minutes to the flight. This continual opening and closing of the motor is unusually severe on oil. At the completion of the long day's grind, a check showed that only two quarts of oil were used, and the remainder was in excellent condition.

You too will find that Socony aviation products will withstand the severest tests a plane gives them.

SOCONY
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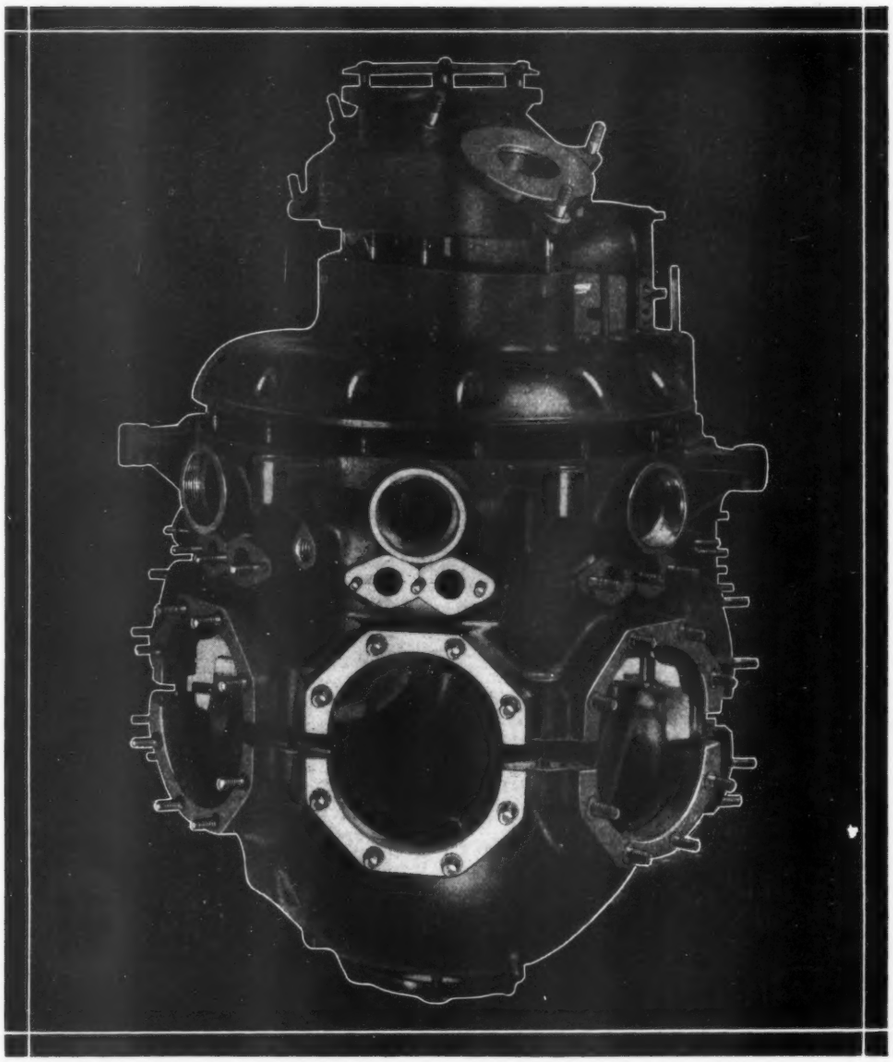
AVIATION GASOLINE AIRCRAFT OIL

STANDARD OIL COMPANY OF NEW YORK



Bohnalite castings guard *Axelson quality*

The quality of crankcase castings in Axelson Engines is in keeping with the fine workmanship. Bohnalite is used exclusively. It was chosen by Axelson engineers after exhaustive test. Bohnalite is 62% lighter than iron. It is uniformly strong, has a close grain structure that machines to a perfect finish and permits a rigid assembly that will not distort when the engine is accelerated to overload. The exhaust stack, cylinder head, rocker boxes and oil pump are also cast from Bohnalite. Weight per horsepower is reduced to a minimum without sacrifice of stability.

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Factory and General Offices,

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(P. O. Box 337)

AXELSON *Airplane Engines*

Bates paid me the finest compliment I've ever had

Bates flies because he's keen about it, and because it saves him good business days every month. When he asked me to go to Boston with him in his Sikorsky Amphibion I broke three dates to do it.

We slid into one of the most comfortable pilot's cockpits I've ever sat in. Roomy. And you can adjust the seat to suit yourself. The engines were warm and Bates picked her off the water with scarcely any run at all. I noticed she climbed fast, and very easily. Bates circled the Bay and put her on her course.

And then . . .

He passed me the wheel of his Sikorsky Amphibion

Bates glanced at me and swung the control wheel over into my hands.

I seldom fly large ships, and I thought of the "S-38" as something a bit difficult to handle. I got the surprise of my life. She controls easily and naturally and is absolutely alive with reserve capacity to do all you ask of her. When I set her down in Boston Harbor, Bates smiled approvingly.

You can guess how much Bates thinks of that ship. She'll do more than 125 miles an hour, climb to 18,000 feet, and fly and maneuver on either engine. His passing over the controls was the finest compliment I've ever had.

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SPEED + SAFETY

Ever since the first Brunner-Winkle BIRD took the air it has held the standard for performance with safety.

Its internal construction, its wing design, its inherent stability—every item of its design and assembly have lifted this plane to its superior position in the popular priced class.

And now the NEW BIRD powered by Kinner 90 H.P. (Approval Certificate No. 239) will win even higher praise for its ECONOMY with SAFETY and PERFORMANCE!

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You look forward to the day you become a licensed pilot, but have you considered the days after you qualify? What are you going to do? Are you spending your time and money to become a sports pilot or are you building for the future?

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Write today and tell us about yourself—the number of hours of instruction, when you expect to qualify—and we'll show you how others are making money on this plan.

BRUNNER-WINKLE AIRCRAFT CORPORATION

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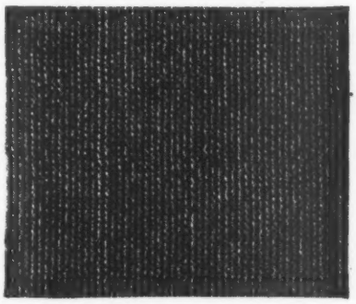
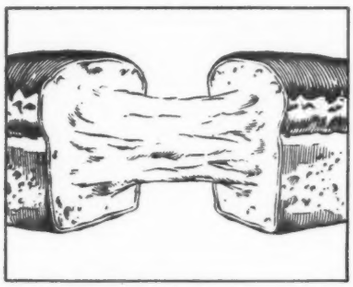
BIRD

Safety Performance

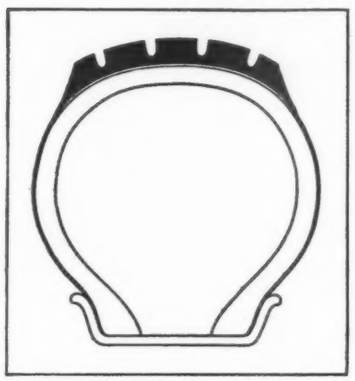
Cords that are *Stretch Matched* and Rubber that is "*Water Cured*"



4 MORE STRETCH-MATCHED *cords to the square inch give Goodrich Split-Second Silvertowns just that much more needed strength and resiliency. They give Goodrich Tires a margin of safety and performance.*



THE WATER CURING *principle of slow baking, as applied to bread, would have prevented this soggy, uncooked interior. Goodrich Water Cured Tires are evenly baked all the way through insuring uniform strength and elasticity at every point.*



Make Take-Offs Quicker, Planes Swifter and Landings Safer on

GOODRICH SPLIT-SECOND SILVERTOWNS

UNLIKE the tire on an automobile, the airplane tire is an *integral* part of the plane.

Puncture an automobile tire and you can control it with the steering wheel. But burst an airplane tire and over goes the plane.

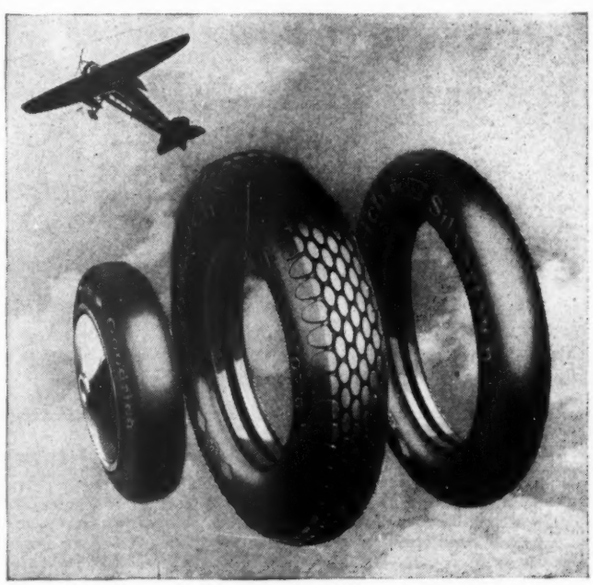
Strength in airplane tire construction, therefore, is vitally important.

Goodrich has attained *strength* without sacrificing lightness of the tire and the plane's speed, by combining the stretch-matched cord construction with the famous Goodrich "water cure" rubber toughening process.

Every Goodrich airplane tire, therefore, is *tough* right on down to the *innermost* ply. On the landing gears of airplanes they make take-offs quicker, the planes swifter and landings safer.

No mere claims need be made for Goodrich Split-Second Silvertowns... world records have proved them!

The B.F.Goodrich Rubber Company, Established 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ont.



GOODRICH TIRES *are light of weight yet strong enough of* construction *to withstand take-off overloads on the worst of landing fields.*

(*Left*) THE GOODRICH NON-SKID *airplane tire has a special streamlined tread that enables pilots to take off on a water-soaked field without any noticeable reduction in flying speed.*

Goodrich

Rubber for Aviation

Pre-Inventory Sale

Special low prices on quality items in order to reduce stock before inventory taking time. All prices good only until January 1st.

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Chocolate Colored Cape Blanket Wool Lining

A winter helmet of best quality soft cape leather with a comfortable, soft wool blanket lining. Cut and tailored to fit snugly without binding, with rolled edge over forehead to retain the shape and fit, and to hold the helmet firmly, making it windtight. Medium size chin strap with buckle fastener.

With the wool blanket lining you have comfort beyond comparison and an inexpensive helmet that will serve you long and well.

B-120, Price, each..... **$4.00**

26x4 Wheels—New (Clincher)	$11.50
26x4 Wheels—Reconditioned (Clincher)	7.00
5/8-inch Shock Cord (New) per foot	.20
3/8-inch Shock Cord (New) per foot	.10
OX-5 Exhaust Manifolds, per pair	8.50
OX-5 Exhaust Elbows, each	1.00
Fahrenheit Gauges	3.00
Oil Pressure Gauges—Plain	1.00
Oil Pressure Gauges—Luminous	2.00
R-W Long Safety Belts—New Style, 3-inch wide, Gray	3.50
R-W Short Safety Belts—New Style, 3-inch wide, Gray	3.25
Zenith Altimeters	9.00

All new merchandise in perfect condition and at prices far lower than any other quotation you have received. Every item is standard and first quality—every one a bargain.

Used Propellers At Less Than Half Price

All of the propellers listed below have been used but just a few hours. Each is in fine condition and represents an attractive bargain. The low prices are intended for quick removal.

Hartzell Propeller (1) (Used) Curtiss-Robin OX-5	$40.00
Hartzell Propeller (1) (Used) Travel Air OX-5	40.00
Hamilton Propeller (1) (Used) Travel Air OX-5 with hub	45.00
Hartzell Propeller (1) (Used) Waco 10 with hub	40.00
Curtiss-Reid Propeller (1) (Used) OX-5	100.00
Hispano-Suiza (Model A) Propeller, (Used)	60.00

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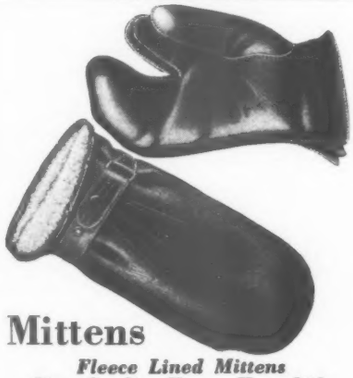
Complete stocks of all kinds of aeronautical supplies permit prompt shipments. Every item fully guaranteed to meet A-N specifications or standards set by commercial acceptance. Prices are consistently lower because of our large quantity purchases. Write for catalog, to Dept. W.



Mittens

Fleece Lined Mittens
Fine Quality Heavy Horsehide

Roomy, short mitten of genuine black durable horsehide, lined with either heavy wool fleece or soft lamb. Neat and well tailored, giving real wearing comfort. The lining makes it especially warm and protective.

A form-fitting wrist, too, makes for greater warmth. Seams are double lock-stitched to prevent ripping.

B-154, Price, (*State size*)..... **$4.00** Pair

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ALL AERONAUTICAL SUPPLIES
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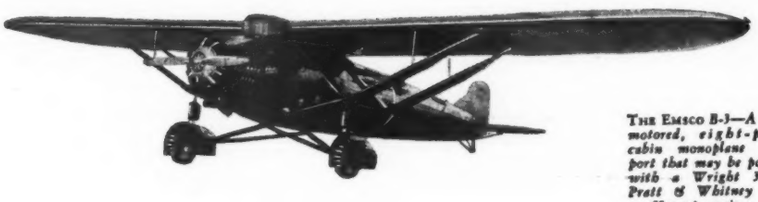
LAMBERT-ST. LOUIS AIRPORT, ANGLUM, MISSOURI

EMSCO

A COMPLETE LINE OF AIRCRAFT FOR LAND AND SEA

THE EMSCO CIRRUS—*A two-place, sport and training, mid-wing monoplane, powered with a 95 h.p., four-cylinder, air-cooled American Cirrus motor.*



THE EMSCO B-3—*A single motored, eight-place, cabin monoplane transport that may be powered with a Wright 300, a Pratt & Whitney Wasp or Hornet engine.*

THE EMSCO CHALLENGER—*A tri-motored, eight-place, cabin monoplane, built to the same specifications as the B-3, except that it is powered with three Curtiss Challenger engines of 170 h.p. each.*

EACH A LEADER IN ITS CLASS

Engineered on sound principles that have been proven by years of experience in commercial and military aeronautics.... Built by master craftsmen in a new $1,000,000 factory equipped with the most modern approved production methods.... These three types of Emsco Aircraft are proving every day their superiority in providing safe air transportation with greatest economy.

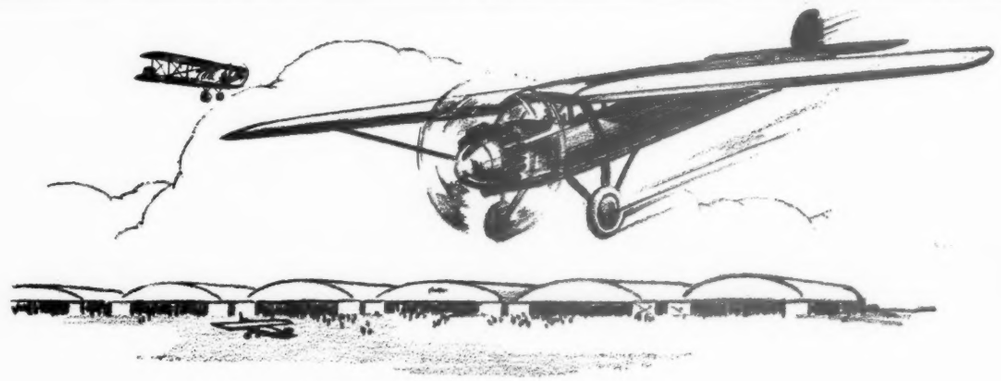
The Emsco Cirrus has flown cross-country under normal flying conditions with a fuel consumption of only 4.8 gallons per hour at cruising speed. Twice the B-3, powered with a 300 h. p. Wright Whirlwind has taken off a gross load of approximately 10,000 pounds with a run of a half mile. The Emsco Challenger has demonstrated its dependability, safety and economy by flying more than 25,000 miles, under all conditions, within the last four months.

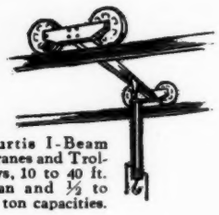
The Emsco Aircraft Corporation is the most recent addition to the world-wide chain of Emsco enterprises, which now number nearly a score. Most prominent among them is the Emsco Derrick & Equipment Co., with plants in Los Angeles, Calif., and Dallas and Houston, Tex. The same sound business principles that have made the name EMSCO on drilling and production equipment, in the oil fields of the world, a guarantee of quality and integrity, are the foundation of this new industry which is but a logical and forward step in the rounding out of Emsco Industrial and commercial activity.

All Emsco land planes are delivered from the factory with pontoon fittings so that no structural changes are necessary to quickly adapt them to seaplane work. The B-3 may easily be transformed into a tri-motored plane as fittings for outboard motors are standard. Structurally the planes are identical.

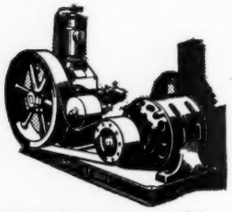
Complete specifications, performance data and prices will be forwarded on request.

EMSCO AIRCRAFT CORPORATION ◆ DOWNEY ◆ LOS ANGELES COUNTY ◆ CALIF.





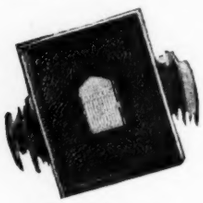
Curtis I-Beam Cranes and Trolleys, 10 to 40 ft. span and ½ to 10 ton capacities.



Curtis Compressors are ¼ to 50 H. P. with capacities up to 250 cu. ft. per minute.

Curtis Air Hoists, capacities from ½ ton to 10 tons.

Curtis Portable Air Tank—For taking air out to a plane away from the usual source of supply.



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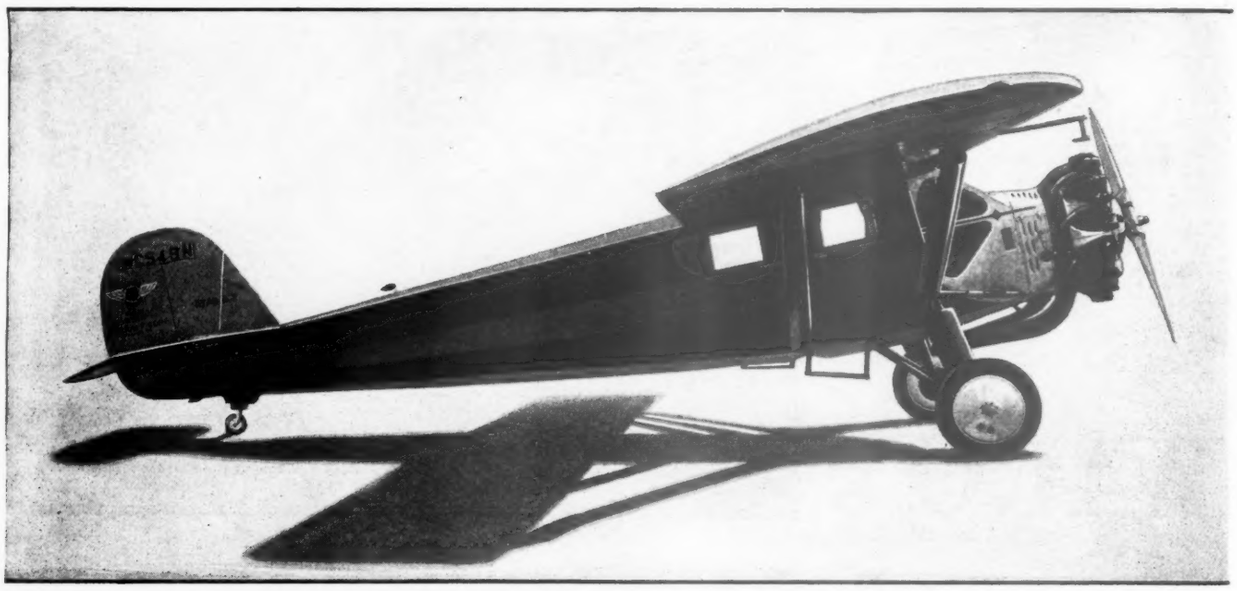

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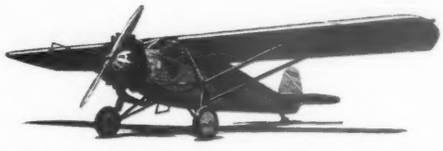

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McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.

Cable Address: "Machinist, N. Y."

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NEW YORK Dist. Office, 285 Madison Ave.
WASHINGTON, National Press Building
CHICAGO, 520 N. Michigan Ave.
PHILADELPHIA, 1600 Arch Street
CLEVELAND, Guardian Building
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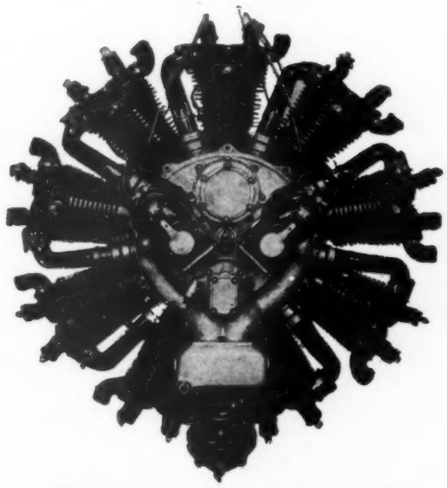

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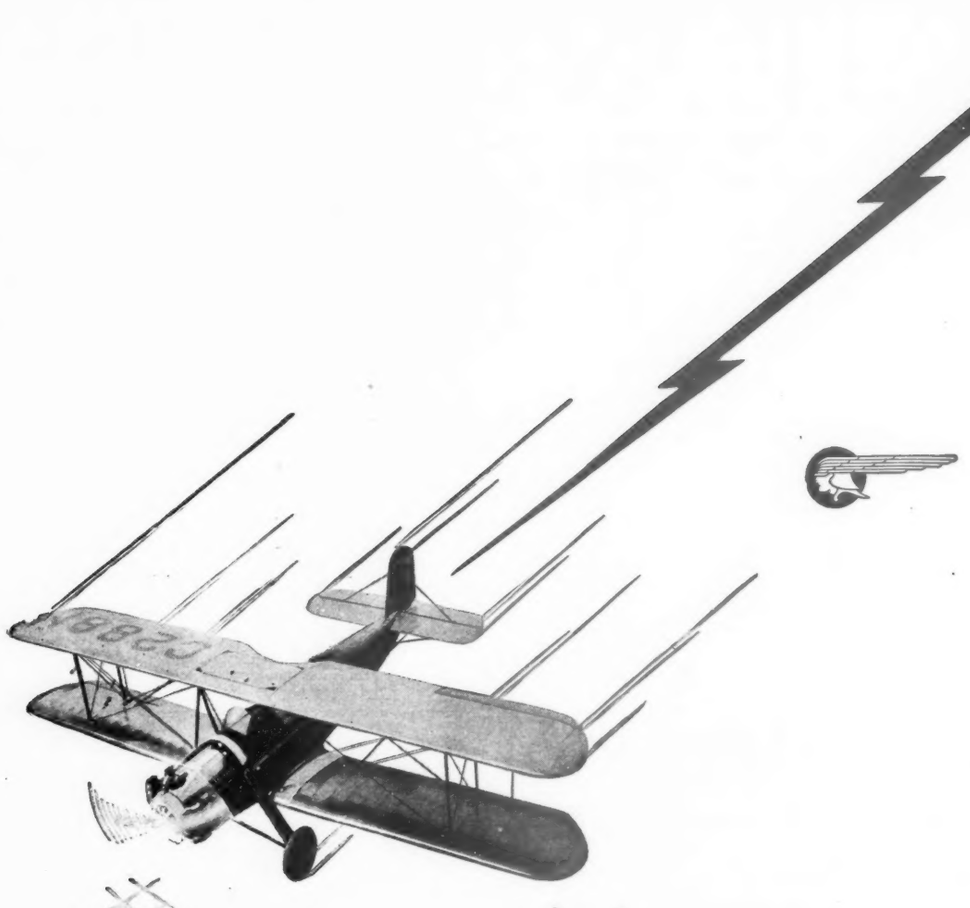

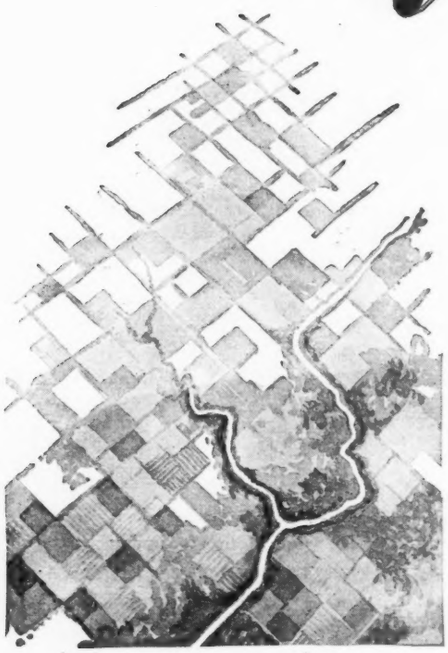

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THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION . . . ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

VOLUME 27 . . . *November 30, 1929* . . . NUMBER 22

Rate-Cutting on Air Lines

AS HENRY FORD observed in the earliest days of automobiling, there are two ways of making a business self-supporting. One may have a small trade at a high price, necessary to balance large overhead and generally high unit costs resulting from meager production, or do a vast business at prices reduced to keep pace with the economies of mass production. There need not even be a difference in the quality of the article produced under the two alternative systems, unless the unit price finds itself governed by competition. If Mr. Ford were now the only maker of automobiles, and able to disregard everyone except his customers, he might either build his present car in the present quantities, or turn out one-ten thousandth as many, of the same model, sell them at a price many times higher, and make a unit profit not much higher than under present conditions and infinitely smaller total profit.

So with air transport. It can be run retail or wholesale. If a complete ground organization and mechanical staff had to be kept up to provide one round trip a week over a long route, it might be necessary to charge 25 cents a passenger mile to make both ends meet. Make the service a daily one, and unit costs come down. Schedule hourly departures, and they drop again. We have so far been on the retail scale. To get away from it, and to increase the volume of operation so that the burden of overhead may be lightened, constitutes the major dilemma of air transport operation.

Taking it for granted that air lines in the United States will receive no direct subsidy, operators have only two alternatives. In no case can it be expected that traffic volume will develop instantaneously, however low the rates might be set and however many planes might be put into the service. It takes time for the existence of a new medium of transport to sink into the public consciousness so that its use becomes normal and automatic. A new habit has to be established. In the meantime, the rates upon air lines may either be set so high that they will show a profit from the start, with the expectation of a gradual reduction as traffic on the line increases, or they may be radically slashed to start with, with deliberate resignation to an operating loss until such time as the public may have become accustomed to using the line. The first option is less prodigal of the company's resources during the development period, but the second gets quicker results.

Theoretically, there is a free choice between the two courses. Actually, it is doubtful if the first could be literally carried out except on a few especially favored routes. Only where existing means of transport are inordinately slow or inefficient is there such a compelling demand for the services of an air line as to enable one to cover operating expenses from the very first,—but that financial disability it shares with very nearly every other novelty in transportation that has been introduced in modern times.

The question is then rather one of how rapid a drain upon capital can be risked. The lower the rates, the sooner we shall have a billion pasenger miles a year of traffic instead of one-one hundredth of that amount. The cutting of rates wherever a substantial operating loss can be accepted, and whether or not competition is a factor, is a step forward and brings the time of really profitable operation nearer. To justify economically the fares that some of the lines are charging now, they would have to increase their volume of business at least fourfold, and then perhaps four times again on top of that,—but they have made it economically possible for the public to ride in sixteen times the present numbers, and they have only to wait for a realization of that fact to sink in. Fortunately most of the transport companies have enough reserve of capital to carry the load. We earnestly hope that they will all adhere, even more definitely than in the past, to the policy of fixing rates at which there is a large potential demand and then looking forward to rapid and continuous expansion of the volume of their service, in

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preference to trying to bring rates, demand, and operating costs into immediate equilibrium.

In the meantime, it is peculiarly important that the government's air mail compensation policy should remain reasonably liberal to help carry over this critical transition period of stimulation of new business.

//

Wanted, Courage!

WITH his customary talent for going to the heart of any matter, President Hoover has struck at the fundamental cause of business depressions, and especially at the threat to business stability that was manifest in the recent stock market debacle. While there has been no specific mention of the aircraft industry in his calls of conferences of industrial leaders, his action has a very definite lesson for the manufacturers and operators of aircraft. They should meditate upon it and shape their courses accordingly.

There are several different kinds of business depressions, and economists provide even more different kinds of explanations, but in most cases they resolve basically into the cumulative results of wide-spread timidity. Let a sufficient number of stockholders become frightened at the same time, and they will dump their securities upon the market at insane prices, utterly without relation to the value of the property that they represent. Conversely, it may be observed that it is equally possible for a large body of speculators to whip themselves and each other up into an enthusiasm producing equally absurd results on prices at the other extreme.

What is most picturesquely apparent in the stock exchange is not confined to that turbulent mart. Exactly the same psychology operates upon manufacturing, transportation, and other business enterprises. Let the builder of any product suspect that business is to be bad, and he scales down production and lays off employees. With their buying power contracted, those who have had them as customers are obliged to reduce in turn. The cumulative process of contraction gathers momentum like the proverbial snowball, and the fear of hard times will have made them a fact.

What any industry needs at such a time, and what the aircraft industry particularly needs at this time, is a definite display of courage and confidence in high places, such as has been afforded by the assurance given by railroad executives after their conference at the White House that there would be no contraction in their plans for the future.

The production of aircraft must be seasonal, and it must be matched up with current markets. When selling actually slows down, production is bound to do likewise, but there is no excuse for any company on a sound footing slowing down its effort to find markets.

The aircraft industry, like every other, is going to have its occasional booms and declines, but the general trend must be steadily forward. Companies that expect to be in business ten years from now will have to keep pushing forward steadily. To back water because of a temporary recession in the stock market, or to stop trying to sell airplanes because sales have fallen off, is as unreasonable as a child's fear of the dark. A great French general once summed up the whole art of war in the vigorous apothegm, "L'audace, l'audace, toujours l'audace," which was freely translated in a Broadway spectacle of a few years ago, "Nerve, nerve, and then a lot more nerve." The motto is an excellent one for all business in time of threatened subsidence, and if it be widely enough adopted business depressions will be few and far between. It is a particularly sound precept for the aircraft industry for the year to come.

//

Seeing Football from the Air

IT MAY BE a little late to comment upon the relation of aviation to the football season, but the Department of Commerce has given us the excuse. Mr. Budwig's warning to pilots of the rules that they are supposed to follow when in the neighborhood of a stadium deserves editorial emphasis. It should be borne in mind during the "intersectional" games which will dot the southern part of the country for the next month. It should register clearly enough upon every pilot's conscientiousness so that it will not be necessary to repeat it next year.

While the seeing of a football game from directly above and from a low altitude has the charm of novelty, no way has yet been discovered of attaining that point of vantage without serious encroachments upon the rights of the spectators in the stands. Even though the airplane never gets into such a position that there would be actual danger in case of engine failure, the ordinary spectator is not an aeronautical expert, and cannot be expected accurately to measure probable gliding angles with his eye. He knows only that he is being seriously disturbed, and that if the plane should "fall," a hypothetical danger that the average citizen is not yet able to put entirely out of his mind, he or his neighbors would be in a very unhappy position. Furthermore, he has come to his seat in the stand for a definite purpose and he wants neither noise or motion elsewhere than on the field to distract his attention. While it would, of course, be impossible to operate airplanes at all if every fear or prejudice of any group of non-flyers had to be taken as imposing a commandment, those who turn out for a sporting spectacle are entitled to enjoy it free of any disturbance of mind, body, or nervous system.

Newspapers want to show their readers a birdseye view of the field and the crowd, and it would be a pity from all points of view too deny them the opportunity entirely. In any case, the legitimate operations of regular aerial photographers are unlikely to make trouble, for they know what they are after, and they get it with a minimum of wasted time and usually without any occasion to fly close to the ground. There should be some check even upon photographic flying, but it need not be by any means eliminated.

The greatest problems are the private flyer or professional pilot out to satisfy his own curiosity, and the navigator of the flying billboard. While we would be the last to suggest any check upon advertising initiative, we do heartily condemn any operation of planes bearing advertising signs back and forth above a stadium with the deliberate intention of compelling the regard of the audience. It inevitably leads to annoyance, if not to dangerously low flying. The regulations of the Department of Commerce are properly strict upon this subject of flying over crowds. It is not sufficient merely to stay at a height permitting a glide to a safe landing place. We profoundly hope that every pilot will feel an obligation to display even more caution and courtesy than the Department's rulings require, an obligation best fulfilled by giving the football field a wide berth except when definite business requires passage through its neighborhood at an ample altitude and for a limited time.

//

The Road Over the Atlantic

THIRTY MONTHS have passed since Lindbergh's immortal hop, and the enthusiastic proclamations then popular that regular commercial airplane service would be established in the immediate future have had time to cool. Trans-Atlantic commercial flying continues the object of serious attention, but its nature has changed. It is for the most part now, and should remain, an intelligent attention, which takes account of the limitations and the difficulties and which restrains the temptation to rush into print with spectacular projects unsound both technically and economically.

Looking at the matter quite cold-bloodedly, the fact is that there is no airplane now in existence, nor so far as can be definitely known in early prospect, which is capable of traveling non-stop for over two thousand miles with reasonable economy and with a reasonable margin of safety for adverse weather conditions. As a matter of fact, in setting the figure at two thousand miles we are trying to be extremely generous. It would hardly be safe to plan on going beyond sixty per cent of that mileage for a regular service over either land or sea. Regular New York-Paris service without any intermediate stop is for the present, and so far as we can see for some time to come, utterly out of the question. The formulation of projects for any such service prior to the actual and conclusive demonstration of aircraft with performances distinctly superior to any now available is a waste of time which could be better employed elsewhere.

Leaving aside that pleasing but for the present unrealizable plan, there are still a number of ways of maintaining an Atlantic air service. There is the South Atlantic, favored by the French and Germans, but of limited direct interest to North Americans. In our own latitude there are the convenient natural stepping stones offered by the Azores and the Bermudan group. Turning farther to the north, the breaking of the journey at Greenland and Iceland comes in for notice, and the straight jump between Newfoundland and Ireland is at least worthy of theoretical consideration, although even that is rather far beyond the realm of commercial possibility just now. Finally, there are the floating islands projected by Mr. Armstrong, their number and spacing being limited only by commercial considerations.

The editorial columns are no place in which to analyze in detail the relative merits of the various routes, but it is appropriate to call attention to a couple of facts that apply to all of them alike. In the first place, the machines used must be seaworthy boats of some sort. No existing landplane, however multi-engined, is sufficiently free from the danger of forced landing to be flown over long stretches of water as a regular commercial practice. Second, practically all of the possible alternatives present a problem of navigation which almost overshadows everything else. Assured accuracy of navigation and under the worst conditions is a fundamental necessity. A lack of certainty that the islands could invariably be located without waste of time and fuel in cruising around to look for them has been the principal factor responsible for the lack of an air service to Bermuda. The location of articial seadromes will be yet more difficult.

Nothing that now exists is good enough, although radio navigation presents an obvious hope with further development. The important point is that navigation be recognized as a key problem, of importance commensurate with the improvement of the technical characteristics of the airplanes. The difficulties in the way of trans-oceanic service by airplanes following some one of the "stepping-stone routes" are by no means permanently insuperable, but they are real difficulties. Their sudden conquest is not to be hoped for. They deserve the constant attention of those most technically competent to deal with them, and our best wishes go with all serious workers in the field, but it will be most unfortunate if a recurrence of excited concentration on commercial Atlantic air service should distract either effort or patronage from undertakings of much more practical imminence.

HIGHLIGHTS OF THE Western AIRCRAFT

IN THE FACE OF general aircraft sales slump, the Western Aircraft Show held in Los Angeles, Nov. 9 to 17 inclusive, proved conclusively that there does exist among the general public an active buyer's interest in aircraft. As a retail sales show the exposition was an unqualified success, and yet there were scarcely, if any, bona fide sales from the show floor. The success of the show lay rather in the very real buyer interest which was created in airplanes, and in the many contacts and arrangements for demonstration flights which will surely result in normal sales during the period following the show. Probably for the first time an aviation show has approached the healthy condition common to most automobile shows, in that auto shows are not held for the purpose of making quantity retail sales, but rather to stimulate buying interest which will carry over through the sales season, and which will serve to build up a live prospect list in a cheaper way than any other method.

Up until the present time the aviation industry has been attending air shows en masse and selling hundreds of planes to each other, with a minimum of attention given to the general public which is after all the ultimate consumer of all aircraft produced. Los Angeles is in the center of the most highly competitive aircraft market in the world. Almost every substantial aircraft builder is actively represented in the Southern California territory, and since the Western Aircraft Show was primarily a dealer's show the manufacturers did not enter the picture to any great extent. For that reason there were comparatively few introductions of new models, and the entire effort of the show was to sell the public on the desirability of purchasing an airplane, not because it was a glorious new model with umpty-ump improvements over the obsolete and antiquated plane in the next section, but because an airplane has become a highly desirable commodity of established worth, if bearing a Department of Commerce License number.

Since Southern California people are supposed to be acutely air minded, they have been "airplaned" to distraction, and the demands on the public to attend this airport opening or that race program has created a condition of nonchalance toward things aeronautical. With planes of almost every description on display at fifty-odd airports in Los Angeles county alone, the local public had become so accustomed to viewing airplanes that the show management anticipated some difficulty in gaining satisfactory attendance. As outlined in a preliminary article on the Western Aircraft Show published in the Nov. 9 issue of AVIATION, a great civic campaign was conducted in an effort to create popular interest. This campaign was a success and the public turned out in gratifying numbers with a very high percentage of real prospects among the show visitors. Final attendance figures for the nine days give a total of 70,000 paid admissions, which figure considerably exceeds even the fondest hopes entertained by officials of the California Aircraft Exposition Association and of the Aeronautical Chamber of Commerce of America when the show was first planned. Financially the show more than paid for itself with a final net profit of approximately $10,000, all of which money will be used to further the development of aviation, and particularly of future aircraft shows.

The Richfield Oil Company's attractive booth

Exhibitors Show a Total of 57 Planes

ALTHOUGH not a national show, the Western Aircraft Show compares favorably with other recent aircraft expositions. A total of 57 aircraft was on display, exclusive of gliders, which is 17 more planes than were shown at the International Aeronautical Exposition of 1928 in connection with the National Air Races at Mines Field, Calif., and two more than were shown inside the exposition building this year at Cleveland. Some interesting comparisons are offered by the planes shown. Of the 57 planes in the show, sixteen were of western manufacture and 41 were built east of the Rocky Mountains. Of the Western planes, thirteen were monoplanes and but three biplanes, a figure four to one in favor of monoplanes for western manufacturers. The eastern planes, on the other hand, were divided into groups of 26 biplanes and only fifteen monoplanes. If the trend in design throughout the world is toward monoplanes, as it has seemed, then the west, numerically at least, must be considered the most progressive section of the industry in developing new designs. Again, in

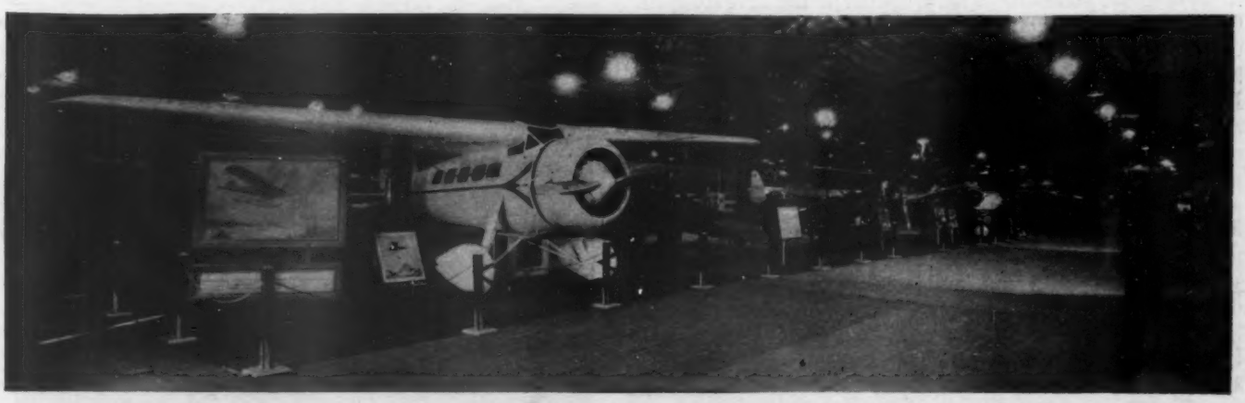
SHOW

Increase in sales is the real test of an aviation exposition, just as it is in every other industry. The Western Aircraft Show recently held in Los Angeles was staged with this idea in mind, and dealers report surprisingly large lists of live prospects. In addition, the show netted a profit and the attendance was larger than expected. Some of the highlights are given in the accompanying article.

considering training planes, four of the twelve western monoplanes were two-place trainers, while but two of the fifteen eastern monoplanes were of the trainer type. There has been a definite swing toward monoplanes for training purposes, despite some reluctance on the part of dyed-in-the-wool biplane pilots, and it must be considered that the West, with the country's greatest number of students actually undergoing flight instruction, has here clearly indicated the progress of the monoplane for primary training.

As has been indicated, the real feature of the show was the advanced show presentation and the sales methods by which the public's interest in aircraft was inflamed and crystallized into a desire to own. The various dealers, knowing each other and familiar with the fact that the sales possibilities of the territory had already been pretty thoroughly canvassed, came into the show with no expectation of great immediate sales, and no one was disappointed. In order to make a satisfactory impression in a highly competitive exhibit, the various dealers prepared special show models such as automobile dealers have long been presenting at their shows. Some exceedingly beautiful paint jobs and interior upholstery work were in evidence, and many of the exhibitors had gone to unusual effort to prepare attractive descriptive pamphlets and to train young men as attendants in addition to the regular corps of salesmen. Where a plane was merely placed in the show, without embellishment, it soon became apparent that the crowds hardly paused for a glance, preferring as they did to pore minutely over the machines which displayed flashy tones of green and gold, or cream, black, and violet, with tan upholstery and polished hardware. Among the most striking "Show" planes were the five Great Lakes, each with a different color combination. Two of them equipped with the new Goodyear Air Wheels; the Emsco "Challenger" and the Emsco "Cirrus" midwing trainer, which were resplendent in highly artistic green and gold finish; the two Courier planes, a two place open trainer monoplane finished in orange and silver, and the three place cabin monoplane, finished in yellow and several shades of blue, red and violet; the Curtiss Robin "Challenger" mounted in a mid-air flight position and finished in pale blue and silver after a striking pattern; and the uniquely painted Moreland monoplanes, the M-1 three-place semi-cabin monoplane finished in blue and gold to resemble a fanciful bird, and the Moreland M-2 trainer monoplane in blue and silver. That the attractive colors and decorative patterns took the public's eye ws abundantly demonstrated and the manufacturers may well consider it worth their while in future not only to take pains with the paint jobs of "Show" planes, but to color and outline production models more strikingly and distinctively. A prize for the best exhibit went to the Courier Monoplane Company of Long Beach.

From the spectators standpoint, the very satisfactory number of nicely upholstered chairs in the various exhibits offered one both the opportunity to rest occasionally, to talk over the merits of a particular plane at length and in comfort, and to sit down and study various planes at ease. Another valuable idea which seemed carried farther than at any previous show was the



A line of planes forming the exhibit of the Detroit Aircraft Corp. In the foreground is a Lockheed, next to it are a Parks P1 and P2 and a Ryan Brougham is in the background

practise of inviting the public to climb into the various planes and get the "feel" of them, convenient platforms being provided in many instances to makes entrance and exit from cabin or cockpit even easier than it would normally be. Theodore Schleuter, Ryan distributor for southern California, was adjudged the best salesman at the show.

Public Shows Interest in Gliders

ONE INTERESTING SIDELIGHT was the number of gliders exhibited and the great interest shown in them. Five gliders were on display, and from the crowds which examined them approvingly it is evident that gliding is on the up-grade. W. H. Bowlus exhibited the Bowlus sailplane, designed by himself and constructed by the Bowlus Sailplane Company of San Diego. This glider is of the soaring type, having a total wing spread, with wing tip ailerons, of approximately 60 ft., a weight complete of but 175 lb., and a price with complete course of instruction and all launching and handling equipment, of $600. The sailplane, in which Mr. Bowlus recently set a new American record of one hour 21 min. 9⅘ sec., was dispayed, and an uncovered sailplane was hung from the ceiling. Two models of the new Evans Glider Company all steel glider were shown, this craft being built up largely of Aerotruss products, with fabric covering. A primary trainer selling knocked down for $247.50, and a soarer of 50-ft. span were exhibited. Another uncovered glider was the primary trainer of "Zögling" type built by the Los Angeles Glider Club and placed in the show. Any aircraft factory might well be proud of the workmanship of this model.

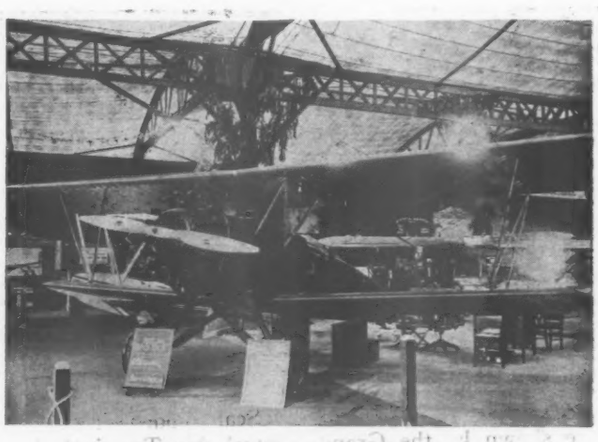
The showing of three planes with the new Goodyear Air Wheels would seem to indicate early popularity for this new equipment. The two small amphibions displayed, the Whirlwind-powered Ireland, and the Kinner-powered Savoia-Marchetti, attracted much attention and favorable comment, possibly indicating a trend toward the small amphibion for the sportsman or independent business man. The showing of three tri-engined planes of six-, eight-, and ten-place capacity; the Kreutzer, Emsco, and Bach respectively, serves to emphasize the belief of western builders that there is a market for the multi-engined medium capacity plane.

A new reversible propeller was demonstrated throughout the period of the show on a Fokker Super-Universal in the rear of the main building, and worked beautifully in the constant ground demonstrations which included taxiing forward, reversing while in motion, stopping the plane by a reverse blast, and running the plane backward to its original position. The propeller is the invention of C. E. McCloud, a Los Angeles man, and has already undergone extensive ground and flight testing. It is being developed under the supervision of officials of the Richfield Oil Company and more will surely be heard soon concerning this device. Working by means of mechanical devices operated by the pilot within the cockpit, the propeller pitch adjusting mechanism has every appearance of being foolproof and satisfactory. The blades, of Standard Steel manufacture, are held firmly in large hub socket bearings and the pitch is positively set by means of a nut and screw mechanism. Also demonstrated on this Fokker plane was a new straight line drive electric starter invented by Vera C. Hodges, of Los Angeles. This instrument is said to weigh but half as much as the ordinary starter and incorporates a positive release which prevents damage due to kick back or engaging while the engine is in operation. Excellent results were obtained in the demonstrations, the Wasp engine being turned over smartly even when quite cold.

Among the planes given their first showing were the Moreland M-2 Trainer, the Earl "Populair" sport biplane, the Timm "Collegiate" monoplane trainer, the Pasadena "Javelin" six-place cabin monoplane, the Courier monoplane trainer, and the Aeronca flivver plane. They will be described in more detail in future issues of AVIATION. Some features of unusual merit, however, deserve mention here. The Courier training plane has been so designed that the wings, landing gear, and tail surfaces are all interchangeable with the Courier three-place cabin plane, each model being powered with the Kinner engine. It is readily apparent that this feature will prove valuable to the dealer who must stock parts, to the school operator using both planes, and to the individual owner, who may start by purchasing a training model, and later convert it into a cabin plane merely by acquiring the cabin fuselage. The Earl Populair is a high performance sesqui-wing biplane of two place capacity and built around the American Cirrus engine. Because of simplified design this model is offered at $3,975. Conventional construction is used throughout except that the fuselage is built of square section steel tubing, which is easier to cut and fit, resulting in a less expensive fuselage with better welded joints. Another feature of the Popular Plane is the use of a rigid landing gear with wheels which embody a self-contained shock absorbing unit. The Timm Collegiate plane with Kinner engine has been granted an approved type certificate. It is of conventional parasol monoplane type of sturdy construction.

The Javelin monoplane, designed by Major S. C. Parr and built by the Pasadena Aircraft Corporation, embodies a number of unusual features. The fuselage is quite "fat" which gives the five passengers a great deal of room; narrow ailerons extend the full width of each wing panel; and tail surfaces are comparatively small. Two pilots sit side by side in an open cockpit in the nose forward of the wing, while the engine is carried under an N.A.C.A. type cowling.

The Moreland M-2 is a conventional parasol two-place training monoplane equipped with Goodyear Air Wheels mounted on a rigid landing gear. The Aeronca is a 30 hp. twin-cylinder engine flivver plane which aroused much interest among those looking for planes at the lower price levels. This little plane seemed to be very well set up, athough much must depend upon official approval of both plane and engine, and upon the actual service which



A Butler Monoplane on display

such a plane will render when put to work. The price set on it was $1,880.

Among the other exhibits, some stood out particularly, such as a gleaming white Lockheed with N.A.C.A. cowl and streamlined wheel shrouds, or "pants," which was displayed in the Detroit Aircraft section, together with the two Parks biplanes, the P-1 OX-5 powered plane, and the P-2 Axelson powered machine, and a silver-and-crimson Ryan Brougham. The Waco, Travel Air, Fairchild, American Eagle, Swallow, Butler, Stearman, Pitcairn, and other exhibits were all attractively arranged. Quite a bit of attention centered on the low wing Barling NB-3, which featured two views of cut away sections of the cantilever wing construction. The crowds were also interested in the Gipsy Moth and Whittlesey Avian, each with slotted wings, and of course the folding feature. Crowds were constantly attracted to the Curtiss section by the operation there of a training instrument which consists of a small model plane controlled in the breeze from a miniature wind tunnel by the operation of full size controls.

The Engine Displays

ENGINE DISPLAYS included the full Wright line, Pratt & Whitney Wasp and Hornet, a beautifully sectioned Kinner in operation showing all working parts, the new Type B Axelson, the Curtiss "Challenger," the American Cirrus, and the improved Comet engine which was so shown that the novel Comet valve action was easily seen.

The feature of the engine section was the announcement of two new engines: the inverted in-line four cylinder Menasco "Pirate" of 90 hp. at 1800 r.p.m., with a weight of 270 lb., and the Apache series, a 200 and a 300 hp. engine, each of seven cylinders. Both of these announcements carry unusual weight at this time. The Menasco engine has undergone a long period of development and flight testing and is now about ready for quantity production in the Los Angeles factory. The advantages of the inverted type are of course obtained: high visibility, low center of gravity, high thrust line, reduction of noise in the cockpits, elimination of engine fumes in the cockpit, and lesser crankcase dilution. With these inherent advantages, Albert S. Menasco has engineered a rugged power plant which may prove popular for small sport and training planes. The Apache engines are the first to employ magnesium metal, or Bohnalite, in all case castings. The result has been a greatly lightened engine and high power-to-weight ratio. The thick sections of the lighter magnesium castings have also helped to increase the general strength of the engine. Ball or roller bearings are used throughout, with exception of the crank pin. These engines have been subjected to lengthy tests and will shortly be submitted to the Department of Commerce. Upon approval, a production program will be inaugurated in the factory located at the Los Angeles Metropolitan Airport.

Among the booths there were many novel displays, with a strong leaning toward miniatures, and either neon lights or flashing lights to attract the attention of the visitors. The Boothe Company offered a most complete showing of aluminum parts and the Port Orford Cedar Company, an impressive display of the uses to which cedar is put in aircraft. The oil companies were all well represented, Richfield, Standard Oil, Shell and Union all having revolving beacons in miniature or lighted airway maps or models. Scale models of airports were shown by the Grand Central Air Terminal, Los Angeles Metropolitan Airport, and United Airport, the new Boeing development at Burbank. The air transport lines such as T. A. T., Maddux, Nevada Air Lines, etc., were particularly well presented in ample booth space.

Among the more recent innovations were the new Paulin level flight indicator; the exhibit by Goodyear of a complete line of Air Wheels, along with a scale model of the new Goodyear-Zeppelin dirigible now under construction; and the display of a new line of Gruss shock strut units. These latter were particularly attractive since the strut was nicely inclosed in a streamline fairing. It was announced that the new Gruss strut is a considerable improvement over previous models, since weight has been reduced, shock absorbing action improved, and durability and freedom from loss of oil or damage on account of dirt and grit has been increased. Two models of the Hex Hangar were shown in the Western Air Express exhibit; the Texas Oil Company featured a working replica of the Sun God refueling team that made the flight across the continent and back; and the Union Oil Company displayed a scale model of the Rohrbach Romar flying boat, in which all three propellers were constantly in action.

A feature of the show of particular interest to children, as well as to grown ups, was the model plane exhibit which featured about fifty scale models ranging from a perfect replica of the Sikorsky amphibion with a wing spread of but 6 in., to a beautifully constructed cantilever wing, uncovered, with a span of ten ft. All types of military and commercial planes were faithfully reproduced in replica in this exhibit.

Exposition Considered Unqualified Success

SINCE the Western Aircraft Show earned money for its sponsors, satisfied its exhibitors, and delighted its spectators who turned out in unexpected numbers, it must be considered an unqualified success. Not only does this auger well for the immediate future of aircraft sales, but it starts the Aeronautical Chamber of Commerce of America off with a bang on its program to sponsor and manage the various sectional shows which may in future be sanctioned in other parts of the country. Too much credit cannot be given to the dynamic Cliff Henderson for the expert way in which he managed the project from the start. However, it must not be forgotten that the Western Aircraft Show was staged in Los Angeles this fall, and will be held here each year in the future, primarily because the local industry first united under the leadership of Fred A. Worthy, president of the California Aircraft Expositions Association, for the purpose of staging a real sales campaign.

To sum up the show's benefits to the industry itself, as represented by Southern California distributors, the observation of one exhibitor will probably best express the general sentiment. This man, a former automobile distributor and now dealer for a leading line of aircraft, stated that he obtained more live prospects for airplane sales during the first three days of the show, than he had ever obtained prospects for the purchase of automobiles during the entire period of any of seven different automobile shows in which he had exhibited. The Western Aircraft Show has unquestionably been the biggest single factor in boosting retail airplane sales in this territory since retail selling of aircraft was inaugurated, and it is thought that the beneficial effects of such a show as this has been will be felt by the whole industry over a considerable period of time.

Col. R. B. Barnitz, Director of Airports for Los Angeles City and Chairman of the Conference

ACCOMPLISHMENTS of All-Western

Representative Group Meets in Los Angeles

IN ACCORDANCE with the program of the Airports Section of the Aeronautical Chamber of Commerce of America, the All-Western Airport Conference, held in Los Angeles Nov. 7-9, was called primarily to bring together the leading airport executives of the western states for the purpose of forming a permanent organization to expedite handling of western airport problems. This plan is also being followed with other sections of the country, the various sections such as New England, Northwest, Middle Atlantic, etc., being of the greatest help to the Airports Section of the national body in so subdividing the consideration of airport problems as to greatly speed their solution.

Properly the most important work of the All-Western Airport Conference was the adoption of reports by the By-laws Committee and the Nominating Committee, which set up the machinery for the functioning of the Western regional section. The by-laws as reported by chairman Woodruff DeSilva of the by-laws committee, and adopted by the conference, stated that the organization should be known hereafter as the Western Airport Conference, a part of the Airport Section of the Aeronautical Chamber of Commerce of America, that the organization should function around an executive committee of eleven members, one from each of the eleven western states, that the chairman of this executive committee should be selected by the committee members, that the committee should meet at the call of the chairman, that the chairman should appoint certain standing committees in various sections of the territory for the consideration of special airport problems, and that two members of the executive committee shoud be selected as national delegates to the Airport Section of the Aeronautical Chamber of Commerce of America.

The report of the nominating committee, presented by Robert J. Pritchard, Editor of *Western Flying Magazine,* named Col. Richard B. Barnitz, Director of Airports for the City of Los Angeles, as chairman of the conference. Colonel Barnitz was also named as delegate to the national body, and Arthur H. Abel, assistant general manager of Oakland Airport, was named as second delegate. Other executive committeemen were: for Oregon, Seely V. Hall, superintendent of Medford Airport; for Washington, David G. Logg, manager of Boeing Field, Seattle; for Idaho, Hon. J. D. Wood, Commissioner of Public Works for the State of Idaho; for New Mexico, William E. Holt; for California, Arthur Hately; for Arizona, Kirke T. Moore; for Utah, John Finch; for Colorado, Chas. D. Vail, Manager of Parks and Improvements for the City of Denver; for Montana, E. E. Mouton; for Nevada, Capt. Roscoe Turner; and for Wyoming, Clarence Holliday. The report was adopted by the conference. Thus was set up the machinery and officers for the functioning of a body which will attack the very real problems faced by the west with its sparse population, rugged terrain, and heavy air travel, incident to the establishment and successful operation of adequate airports.

Small but Enthusiastic Group at Opening

THE All-Western Airport Conference opened Thursday morning, Nov. 7, with a small but representative and enthusiastic group present. The total registration was approximately 60 persons, with at least one man from each of the eleven western states. Perhaps the most important accomplishment of the conference was the adoption of three resolutions at the close of the discussion periods.

The resolution of most significance to the western states was that presented by the Hon. J. D. Wood of Idaho, and adopted by the conference, as follows:

"Since the airways of the nation may be expected to assume a rôle similar to those of the railways and highways, both of which have required Federal aid, and

"Since in case of national emergency national airways become of prime importance, and

"Since disparity in distribution of population and wealth makes inequitable and impossible the assessment of total airport cost to each locality in which development is necessary,

"Therefore, the committee recommends that the All-Western Airport Conference approve the principle that the responsibility of developing adequate airport facilities in America, aside from private industrial enterprises, belongs to the Federal, State and local governments.

"The committee further recommends that a commit-

OF THE

AIRPORT CONFERENCE

to Discuss and Speed the Solution of Western Airport Problems

tee be named to study the problems and work out a plan whereby the whole responsibility may be equitably and jointly apportioned among these various governmental agencies, so that each may bear its fair proportion of the burden, and no more."

The suggestion incorporated in the last paragraph will be carried out by the new chairman of the conference and a report on an actual plan for equitable Federal and State aid will be presented in the near future. It is readily apparent that the West, with its comparatively small population and wealth, is more in need of Federal aid for an airport program than are some other sections of the country.

Another important resolution adopted by the conference was presented by Earle Ovington, chairman of the Uniform Airport Rules Committee, and which read:

"Inasmuch as uniformity in Airport Rules is desirable and inasmuch as the Department of Commerce has issued a Bulletin, No. 20, Oct. 1, 1929, on 'Uniform Rules for Airports,'

"Therefore, be it resolved that this convention recommend that all airports use the Department of Commerce suggested uniform airport rules as a basis for Airport Rules and that a standing committee be appointed by the Western Airport Conference to take up these rules with all airport authorities in the Western States. This committee is also requested to advise with the Aeronautical Chamber of Commerce and the Airports Division of the Department of Commerce as to uniform signals and codes to be used to control traffic.

Sources of Revenue Classified

AN IMPORTANT REPORT was presented at the close of the conference by Arthur H. Abel for the Committee on Standardization of Airport Charges. The report was quite lengthy, going into all phases of airport revenue

The Western Airport Conference Luncheon at the Hotel Alexandria, Los Angeles

in considerable detail. However, all legitimate sources of airport revenue were classified as follows:

1. Hangar rents.
2. Leases on ground with improvements.
3. Leases on ground without improvements.
4. Commercial charges, fees for the use of the port.
5. Office, shop, and locker rentals.
6. Concessions.
7. Landing fees.
8. Parking fees.
9. Facility charges, tow cars, compass swinging platforms, etc.
10. Sale of supplies.
11. Charges for services of mechanics.
12. Charges for admission of public to the field.

The committee felt that the first three charges listed above should be based on the cash value of the port and improvements thereon and must be fixed on such a percentage basis as to allow for carrying the cost of improvements, and eventually of the land itself. In addition, it was felt that private ports must make an added allowance for profits on the operation of the airport.

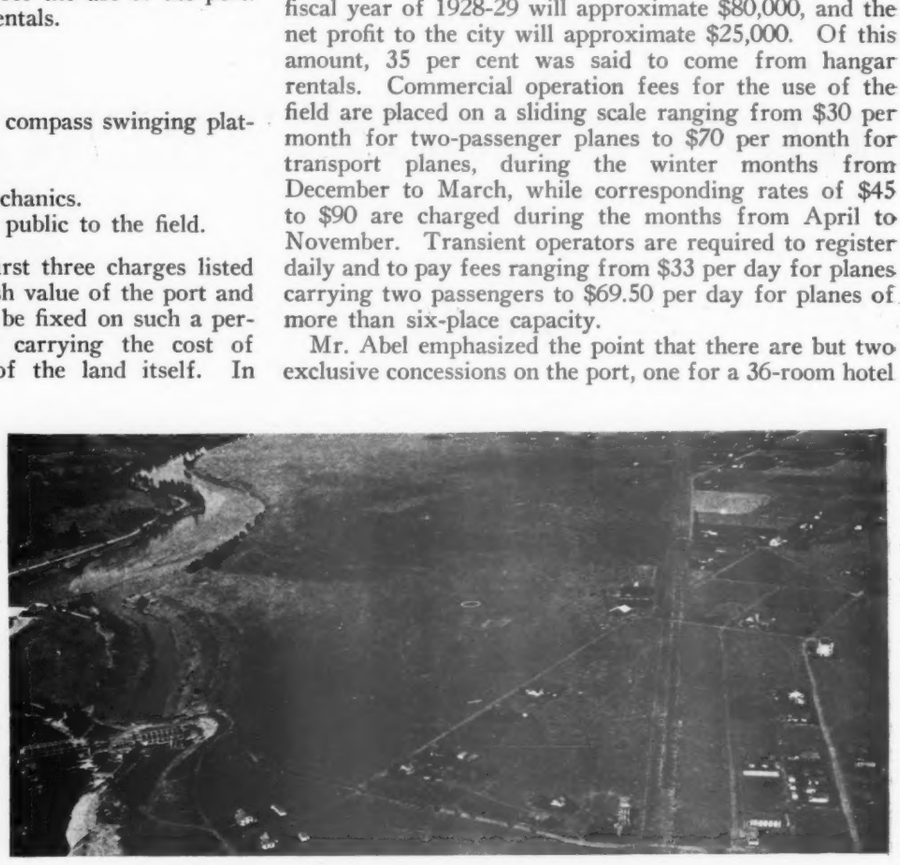
It seemed to the committee impossible to fix any exact schedule of charges on hangar rentals, but it was felt that charges should be on as simple a scale as possible and should be based on actual floor space occupied. It was thought that there should be no charge at all or a very low charge for the use of the airport, and that there should be no parking charge for spectators. The committee felt that it was not possible at this time to set up any standard basis of charges for the sale of supplies or the service rendered by mechanics, leaving these charges rather to the various local conditions to determine.

This report was summed up in the following words: "Your committee believes charges should be based on actual value given: That landing charges should be omitted for the time being, that location and corollary matters be considered in fixing rentals of salesroom and similar facilities; that concessions, excepting perhaps gas and oil, be handled on a flat-rate basis."

Arthur H. Abel Discusses Revenues

PRESENTATION of all papers was completed on Thursday, Nov. 7, with discussion of these papers being carried on during the several sessions that followed on Friday and Saturday. During the first morning session, presided over by William E. Holt, New Mexico, two papers were presented. Arthur H. Abel, assistant general manager of Oakland airport, presented a lengthy paper dealing with "Standardization of Airport Revenue," based on approximately two years of municipal operation of Oakland Airport. Mr. Abel emphasized the fact that the Oakland port is a part of the general harbor development, administered by a nonpolitical harbor commission, and that it has had to pay its own way from the start. He said that land leases cannot pay airport costs, but that airport charges for various services must be relied upon to pay the costs of improvements and operations. Mr. Abel stated that the Oakland airport has cost the city approximately $1,150,000 to date, but that the gross revenue for the fiscal year of 1928-29 will approximate $80,000, and the net profit to the city will approximate $25,000. Of this amount, 35 per cent was said to come from hangar rentals. Commercial operation fees for the use of the field are placed on a sliding scale ranging from $30 per month for two-passenger planes to $70 per month for transport planes, during the winter months from December to March, while corresponding rates of $45 to $90 are charged during the months from April to November. Transient operators are required to register daily and to pay fees ranging from $33 per day for planes carrying two passengers to $69.50 per day for planes of more than six-place capacity.

Mr. Abel emphasized the point that there are but two exclusive concessions on the port, one for a 36-room hotel which will bring in approximately nine per cent of the total revenue, and another for the restaurant and lunch counter which brings in about seven per cent of the revenue.



Spokane (Wash.) Airport, which in 1927 was the scene of the National Air Races

Companies selling fuel and lubricants are required to install and operate their own equipment on leased ground and pay to the airport one cent on each gallon of gasoline and five cents on each gallon of lubricant sold, this source accounting for about three per cent of the field's income. Other revenue is obtained from miscellaneous sources such as charges for hangar lights, field flood lights, locker and tool box rentals, sale of water, garage and dock rentals (the airport adjoins a navigable waterway), and tolls on outgoing telephone and telegraph messages. In closing Mr. Abel stated that these charges are resulting in an average net profit to the city of about $2,000 per month and that the operators using the field are all well satisfied and making money.

Capt. David G. Logg, manager of Boeing Field, Seattle, next presented a paper dealing with "Standardization of Airport Traffic Regulation" and based on Aeronautics Bulletin No. 20, Oct. 1, 1929. Captain Logg rather humorously compared the present air traffic rules to a condition in the world of football where every team might be permitted to make its own rules and a strange team might be acutely embarrassed to find that the rules

under which the game was being conducted permitted slugging the man with the ball, or playing with 15 men on a side instead of 11. He also called attention to the present lamentable condition in connection with the operation of automobiles in that a driver may find varying regulations as to parking, speed, turning corners, etc., in almost every town visited during the course of an extended tour. Captain Logg suggested that in many cases it would be necessary for states to pass laws regulating air traffic due to the fact that certain cities or counties are not empowered by their charters to so function. He said that in reguating traffic adjacent to Boeing Field, King County, State of Washington, enacted a law which adopted the entire schedule of rules laid down in Bulletin 20, with only such additional clauses as seemed necessary to further protect the county, the airport, and the operators on the port.

One interesting point brought out by Captain Logg was that such things as topography may cause variation of the air traffic rules as promulgated by the Department of Commerce. He said that because of a ridge of hills near Boeing Field it had been necessary to call for a right turn when taking off into a south wind, and a left turn from the field when taking off into a north wind. A red flag in the day time and a red light at night, appropriately displayed, call for the left turn, while green light or white flag is the signal for right turn. One phase of traffic regulation needing considerable attention, according to Captain Logg, is the development of more satisfactory audible signals, and the provision of beacon lights which have code characteristics which will clearly indicate the field at which the beacon is operating. In closing, Captain Logg made a strong plea for the uniform adoption of air traffic rules worked out by the Department of Commerce.

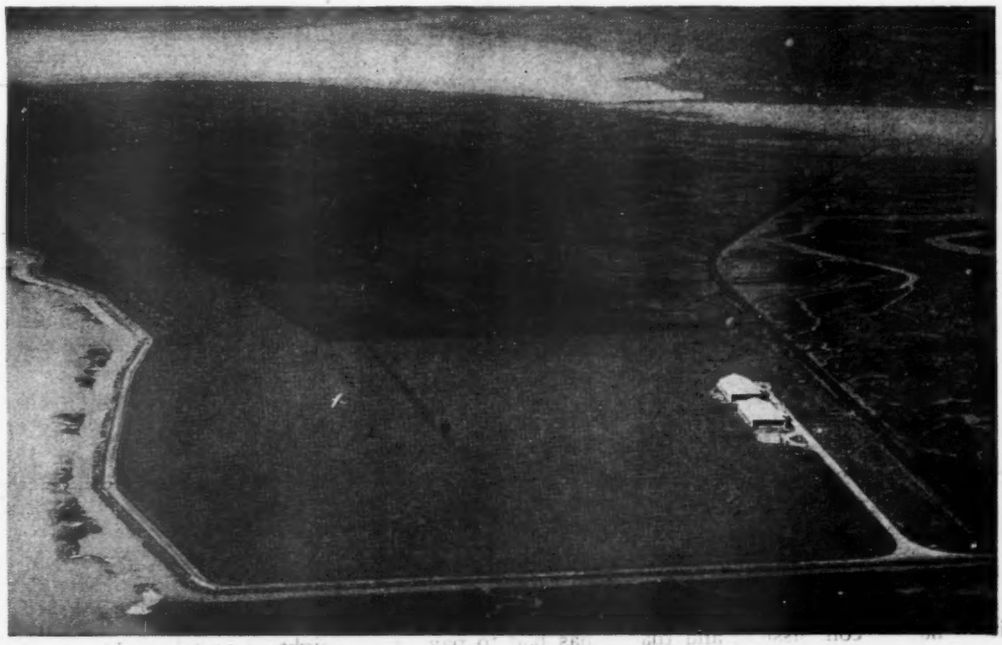
J. D. Wood Asks Federal Aid

THE AFTERNOON SESSION, presided over by Dr. Ford A. Carpenter, of Los Angeles, included the presentation of three interesting papers and one oral report. J. D. Wood, Commissioner of Public Works for the State of Idaho, made a strong plea for federal aid for airport construction projects in his paper, "Who Should Build the Airports." Mr. Wood called attention to the fact that the railroads were heavily subsidized by the government during their early period of growth, and that highway development is now being heavily supported by the Federal government. Mr. Wood also called attention to the continued exertions of the Western States Aeronautics Board, of which he is temporary chairman, which was formed in Salt Lake City, Aug. 26-27, 1929, and which board has urged the immediate adoption of airport building programs according to Department of Commerce requirements, by all cities and counties inadequately equipped with airports. He further reported that the Aeronautical Chamber of Commerce of America, the National Aeronautic Association, the Guggenheim Fund for the Promotion of Aeronautics, and the American Bar Association, all seem to be in agreement on four important questions concerning airports and air traffic, as follows:

1. That aircraft should carry United States licenses only, and not be required to carry a license from each state operated in.
2. That some one simple tax, perhaps a tax on aviation gasoline, should be used to raise money for airport development.
3. That air traffic rules should be left to the Aeronautics Branch of the Department of Commerce for solution.
4. That air transport operations are too young for any attempt at rate control, or regulation.

Mr. Wood said that he could visualize the airport program if Congress would grant funds and authority for federal co-operation, since such an action would result in the immediate development of state and interstate airways based on systems of allied airports, with the Secretary of Commerce, the Secretary of Agriculture, and all State Highway organizations available for assistance in developing the needed fields. Mr. Wood closed with an urgent request for the early adoption of some general plan calling for the provision of adequate ground facilities for aircraft operation in greatly increased numbers.

Woodruff De Silva, assistant director of airports for the city of Los Angeles, presented a long paper on "Marketing the Airport." He emphasized the importance of the right publicity and advertising, the proper treatment of the public, development of field facilities, and beauty of field equipment and buildings in order that the general public may be brought to the airport in greater numbers to patronize operators using the field.



The Oakland, California, Municipal Airport as it appeared just before completion

Mr. De Silva asked the delegates to particularly note the uniformly attractive Spanish architecture which has been used on all buildings erected on the Los Angeles Municipal Airport, stating that he thought this the first serious effort that had yet been made to establish a uniformly high standard of architectural beauty for buildings on an airport. He said that this beauty of surroundings at the field, coupled with the proper treatment by field attachés, was of the greatest help to field operators or aircraft distributors in closing prospects for plane services or sales.

Mr. De Silva stated that the city of Los Angeles plans extensive billboard, magazine, and direct mail advertising of the facilities available at the new municipal airport, that monthly dinners for aviation executives are to be held at the port, and that good will air tours in which no stunting is permitted, are invaluable for building airport patronage in the towns visited. He also emphasized the fact that an airport's reputation depends upon the manner in which visiting pilots are treated, and that it is important to send all pilots away from the airport with the best possible impression of it. Mr. De Silva closed with the thought that airports at the present stage of development need every possible form of publicizing and exploitation in order to attract public notice and bring added business for aircraft operators.

An oral report on the development of the Army primary training field at March Field, Riverside, Calif., was given by Capt. W. J. Harper.

Discusses Operators and Management

THE FIRST AFTERNOON SESSION and the presentation of papers to the conference closed with an excellent paper on "Relation of Aircraft Operators and Airport Management" read by Waldo D. Waterman, general manager of the Los Angeles Metropolitan Airport. Mr. Waterman grouped the various operators as: transport companies with large fleets of aircraft; air service companies, with fleets of smaller taxi planes; schools, dealers, and distributors, manufacturers, private owners, and business owners. He brought out the difficulty of satisfying such a wide range of airport users and the necessity of so operating the airport that all users of it can earn a profit, thereby making it possible for the airport management to realize a profit. One interesting suggestion by Mr. Waterman was that the operators themselves might be organized to enforce airport rules by means of an informal Kangaroo Court, thus saving the airport management considerable embarrassment in some circumstances and avoiding friction between management and operators. He pointed out that under such an arrangement the airport management still has the authority to step in and punish a serious offense. Mr. Waterman advocated frequent meetings of all operators with the management, urged the actual ownership of sites and hangars by individual operators as an incentive to improving the appearance of the field, and expressed himself as opposed to the granting of any exclusive concessions or privileges on the port.

Grand Central Air Terminal, Glendale, Calif.

Friday's sessions were held at Los Angeles Municipal Airport in the forenoon and at the Western Air Express Hexhangar located on the Alhambra field, in the afternoon. General discussion was conducted on all papers presented to the conference. F. D. McKinstry, of the Los Angeles Bureau of Power and Light, engineer in charge of installation of lighting equipment on the Los Angeles Municipal Airport, urged that all lighting problems be referred to the engineers of public utilities companies who have all the necessary data at hand and will gladly co-operate in an unbiased way on the solution of such problems.

Mr. Robert Pritchard asked about the eventual levying of a landing fee at airports, and Mr. Arthur Abel stated that he thought it would become general practice in the future, although not now regarded as a likely source of airport revenue. C. A. Campbell asked about the wisdom of charging admission to the flying field for special events. Mr. Abel replied that this could never be done at the Oakland Airport and he thought it poor policy anywhere, unless for some event such as the National Air Race program. Mr. Earle Ovington suggested that one-plane hangars with individual padlocks might prove popular and the opinion seemed to be that there is no demand as yet for such a service.

In discussing traffic regulation, Mr. Pritchard asked about the possibility of developing an automatic semaphore system to replace flagmen on the runways. The general opinion was that flagmen are unreliable and a committee was appointed to study the problem of proper signals. Smoke pots as wind direction indicators were suggested and the conference moved that the need for a uniform type of tail skid shoe be brought to the attention of the manufacturers, it being suggested that some combination of the tail wheel and skid might be worked out to eliminate tearing up the runways except in emergencies requiring quick stop.

The third day of the conference was devoted largely to an inspection tour of Los Angeles County airports, including the Los Angeles Metropolitan Airport, United Airport, and Grand Central Air Terminal. An official reception at the Western Aircraft Show concluding the work of the conference.

With the early appointment of standing sub-committees to study and report on airport problems, and with the appointment of two delegates to the next annual airport convention in Buffalo, it is believed that this first Western Airport Conference has been a giant stride forward toward the establishment of adequate ground facilities for aircraft operations in the western states.

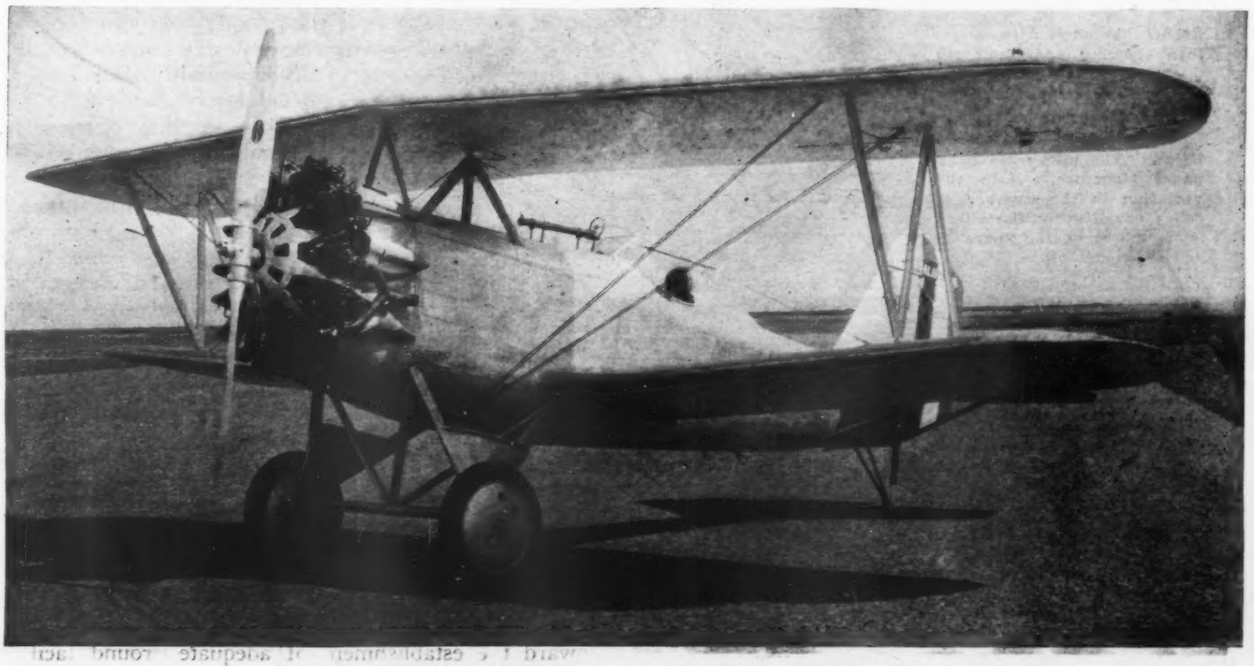
THE *Hall* SHIPBOARD FIGHTER

Wasp Powered XFH-1 Embodies Fuselage Designed for Emergency Flotation and Other Safety Features

By LESLIE E. NEVILLE
Technical Editor of AVIATION

IN ORDER to meet the demand of the Navy Department for a shipboard fighter embodying the principle of emergency flotation and other safety features, the Hall Aluminum Aircraft Corporation, Buffalo, New York, has developed the XFH-1. This design, which was worked out in cooperation with the Bureau of Aeronautics, was recently completed, and has been undergoing a series of test flights. The XFH-1 is a single seat biplane of conventional arrangement for this type of service, but having a number of noteworthy constructional features. Another interesting feature in addition to the watertight fuselage is a means of quickly dropping the landing gear in the event of a forced descent on the water.

The XFH-1 is powered with a Pratt & Whitney Wasp engine and complete military equipment is included



The Hall XFH-1 Shipboard Fighter, powered with a Pratt & Whitney "Wasp" engine

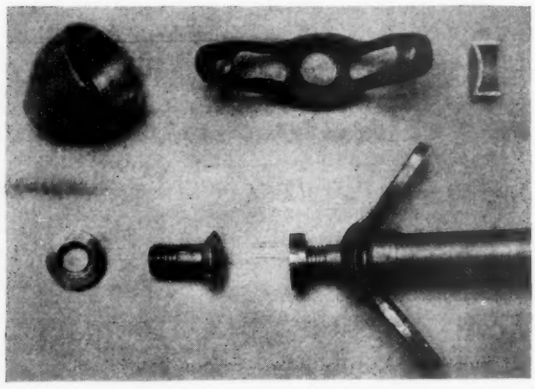
in the installation. The airplane has a wing span of 32 ft., an overall length of 22 ft. 6½ in. and an extreme height of 9 ft. 3 in. The weight empty is 1,755 lb. and the gross weight 2,514 lb. The structure is built entirely of metal, aluminum alloy being used in all principal parts. Wings and tail surfaces are covered with fabric. The general type of construction is the result of a number of years research by Charles Ward and Archibald M. Hall, and is used by certain other manufacturers. Several characteristics are noted in this design as well as in the general methods of construction adopted by the Hall Company. Among these are the wide use of sheet metal stock and drawn section members, and the success with which accessibility for riveting has been obtained. Ingenuity also is shown in obtaining concentric loading and balancing out secondary stresses in the structure.

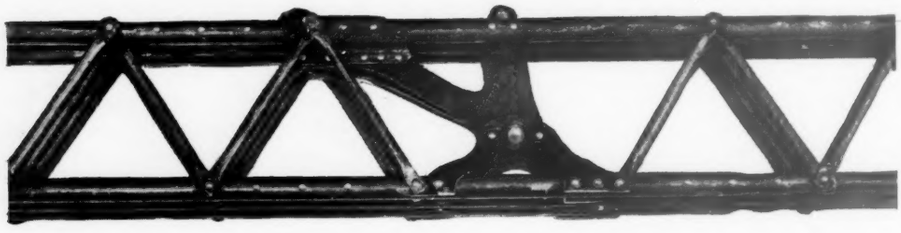
A considerable saving in weight is affected in this design due to the careful proportioning of the individual members. This saving is not attributable alone to the substitution of aluminum alloy for the more usual forms of construction but is the result of thorough consideration of all principal structural members with the object of eliminating unnecessary material wherever possible. The principal members have been designed to resist stress maxima to which they may be subjected in service and, what is more important, even the smallest details in the design of the airplane have been given the same consideration.

As previously mentioned secondary stresses have been treated with extreme thoroughness with several general objects in view. The design takes advantage of every opportunity to balance one secondary stress against another to reduce the effect of both. Wherever stresses of this order could not be utilized to advantage they have been eliminated, in some cases by the use of full concentric joints and in others by controlling the curvature of the gravity axis of members subject to combined side load and end load so as to eliminate the effects of column action. At certain points secondary stress has been introduced to relieve the free edges of open hollow sections or to control the plane of flexure of unsymmetrical sections. The effective strength of members has been enhanced through restraint or fixing of their ends in nearly all cases where the deflection of the entire truss under load would then result in double curvature of the member. In cases where single curvature would result end fixing has been avoided. Several examples of this principle will be shown in detail later.

Very gradual changes in length, width or moment of inertia in the members of trusses have been maintained and forms allowing high unit stress while also embodying a large ratio of length to width have been used. Each web member has been arranged to form an integral part of the entire truss. The various trusses have been proportioned for single intersections and to approximately equilateral triangles. Insofar as practicable, however, the shorter panels have been reserved for members that are most highly stressed in compression.

Wherever practical round tubing has been used for

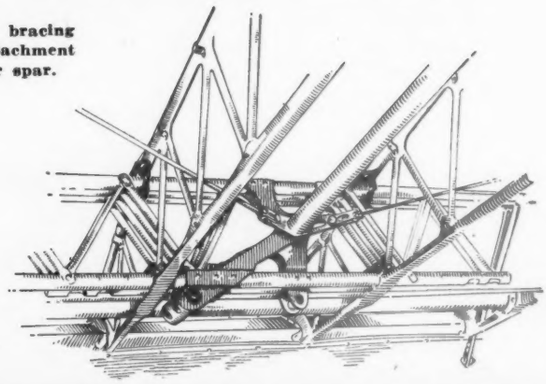


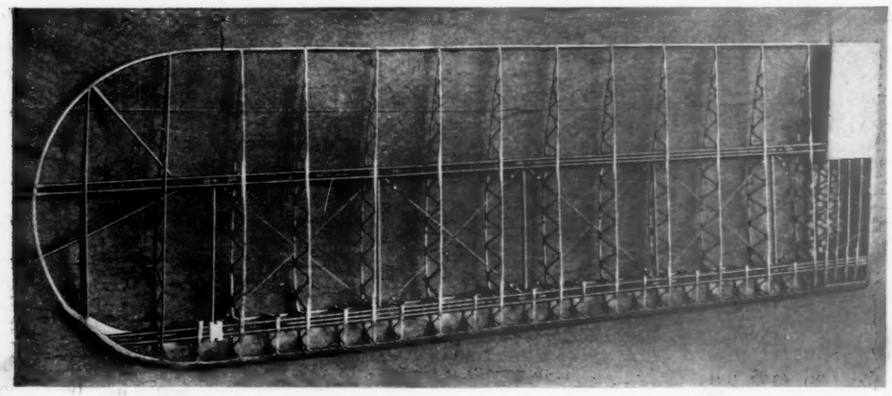


Top: Fittings used in the drag bracing of the wing structure. Above—Attachment of a fitting to the multitubular spar.

Right: Sketch of wing structure showing spar and rib construction, and drag bracing

Below: The uncovered wing panel structure. Note the variation in the number of tubes constituting the chord members of the spars





structural members while in other cases the form of section most efficient has been used.

THE WING consists of spars built up of aluminum alloy tubes and ribs blanked and pressed from 17ST Alclad sheet. Trailing edges and nose stiffeners also are of aluminum alloy. The tail surfaces are similar to the wing in general construction except that the spars consist of a single tube instead of the multi-tubular truss used for wing spars.

Wing spars are formed of a plurality of tubes and the web members are also of tubular form flattened at the ends and riveted to the chord members. The ratio of spar depth to spar width in relation to the length of the lift bays and the drag bays is carefully maintained. A high efficiency is therefore attained by mere form of cross section.

Wherever in a truss or lattice column the diagonal web system terminates at a rectangular gusset plate, the secondary stress in the chords adjoining the gusset is very large, not infrequently being 100 per cent, of the primary stress. This is due to the widening of the column under load which accompanies its shortening. The diagonal web system has no tendency to restrain this widening but a rectangular gusset effectively prevents it, and so produces a large bending moment in the half panel adjoining. The panel joining plates of these trusses are of Y form obviating any half panels and permitting of the attachment of lift and drag bracing to the spars without interruption of the continuity of the diagonal web system. This elimination of a large secondary stress, otherwise present, allows the use of lighter members for the spar chords. Incidentally the weight of joint plates is also much less.

Reduction of area of the chords where less stressed under combined side and end loads involves, for an upper spar, the reducing of the lower chord area near the spar and of the upper chord area near mid span. For a lower spar under such combined load the upper chord is reduced at the support and the lower chord near mid span. This is accomplished by varying the number of tubes in the chord members of the spars. Such variation in area between upper and lower chords results in a shifting of gravity axis of the spar section to a position away from its position of symmetry and nearer to the larger chord. In other words, the gravity axis of the spar has been cambered along the spar length in the same way as if the spar were built to a curved form.

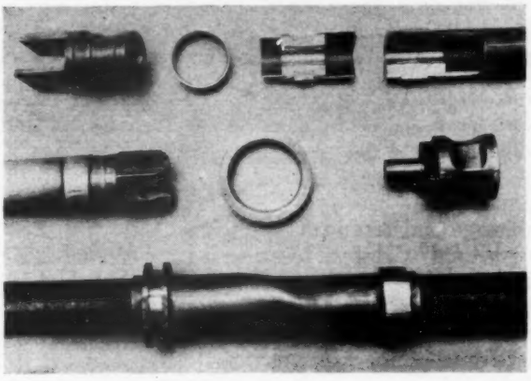
In the condition of pulling out of a dive the lift load tends to straighten a spar constructed in this manner between its interplane supports. If the spar has been correctly proportioned it will be quite straight when the intended maximum load factor has been reached. Thus the column bending moment otherwise due to the product of end load by the eccentricity from sidewise deflection has been eliminated.

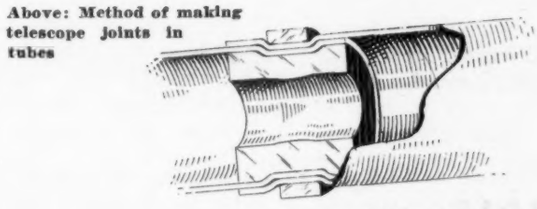
Tests show that in cambered spars of this type the ultimate load sustained is not approximately at the yield point as indicated by permanent set after the removal of a load increment. On the contrary these spars will sustain at failure 40 to 50 per cent more load than was required to produce the first well marked permanent set.

The principle of preventing failure by column action through a shifting of the gravity axis is also noticeable in the gradual variation of the width of the web members in the rib truss. These members are of parabolic cross section approximately 55 deg. angles. The apex is kept straight and the web is upset at its intersection with the chord sufficiently to center its gravity axis on the chord flange. This arrangement results in a gradually curved gravity axis of the web member on the chord flange tending, as the load is applied, to increase the compression at the apex of the section and to relieve the edges so that they will not buckle. The large fillet ends joining the web members to the chord flange afford through their rigidity a considerable end fixity to both.

Further reinforcement against buckling is used for the rib chords, the outer flanges of which are occasionally braced to a panel joint. Such bracing adds about 16 per cent to the ultimate strength of the entire rib.

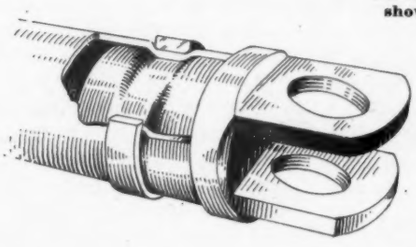
The ribs as a whole are of Z section and unsymmetrical. Instead of setting them in a plane perpendicular to the wing panel they are set at an angle of

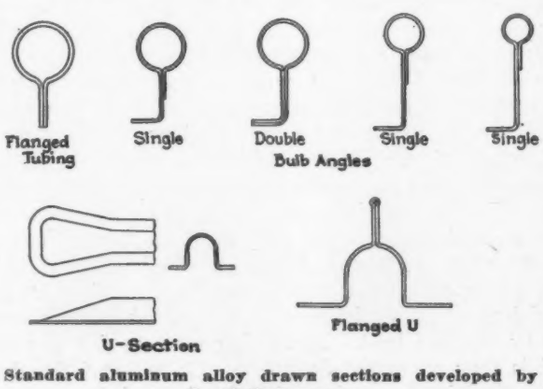




Above: Method of making telescope joints in tubes

Cut-away Sketch showing method





Standard aluminum alloy drawn sections developed by the Hall Company

88 deg. thereto the object of this being to check failure.

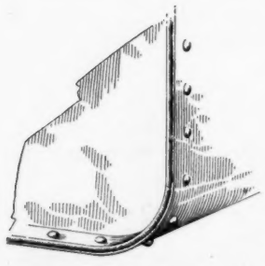
In the lower wing panel structure the front spar chords are ½ in. in diameter, 0.035 in. wall, while rear spar chords are ½ in. in diameter x 0.032 in. wall. There are three tubes in each chord for the most highly stressed portions and two tubes for those less highly stressed. The spar web members are of 17ST tubing $\frac{5}{16}$ in. in diameter, 0.028 in. wall and ¼ in. diameter, 0.028 in. wall. Ribs are blanked and pressed from a 0.024 in. thick 17ST Alclad sheet. The tips and trailing edge are of 17ST tubing $\frac{7}{16}$ in. in diameter and 0.028 in. wall thickness drawn to oval form. Nose stiffening is of 17ST alclad sheet 0.016 in. thick.

The length of the panel is 12.95 feet and the chord 48 in., and the area 50.7 sq.ft. The weight per sq.ft. of structure is 0.662 lb. Detailed weights are as follows:

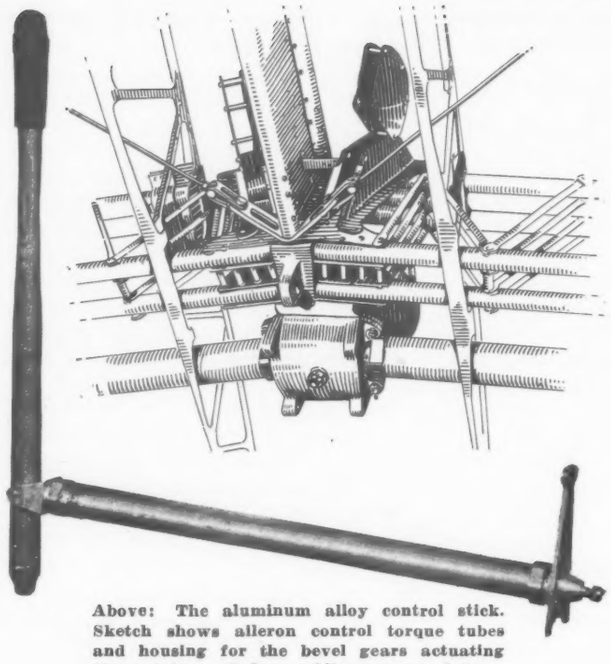
Beams—front	6.70 lb.
Beams—rear	6.21 lb.
Trailing edge	.37 lb.
Ribs	6.25 lb.
Drag struts	.93 lb.
Drag wires and terminals	3.81 lb.
Fittings drag wire	1.10 lb.
Nose covering	4.50 lb.
Wing tip bow	.25 lb.
Rivets	.50 lb.
Protective coating	1.10 lb.
Braces	.30 lb.
Cover	3.25 lb.
Dope	5.60 lb.
Walkway	1.50 lb.
Hinge pins and nuts	.38 lb.
Total	42.75 lb.

Ribs are of Clark Y airfoil section, weigh 0.305 lb. each and support a load of 510.5 lb. in high incidence condition. Ailerons are mounted by a continuous hinge on their top surface. The fabric covering on the panel is drawn into a slot on the under surface with a wire and no further sewing is necessary to secure the fabric.

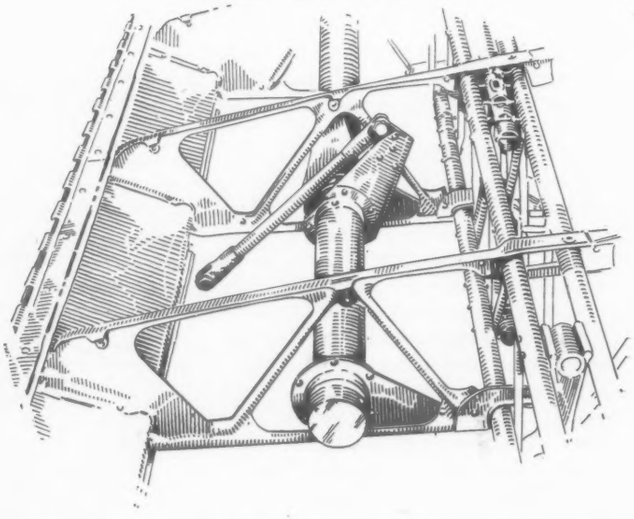
Drag bracing consists of tubular struts provided with spherically cupped end fittings each of which engage the upper surfaces of a double ball head bolt. Drag wires are attached to a forked and spherically cupped strap, the interior of which fits accurately the lower ball surface of the bolt which is passed through drilled holes in the strap and spar joint plates and secured by a nut. The larger sizes of these fittings are turned from forged bar stock while the smaller ones are blanked and pressed from sheet 0.05 in. thick. The double ball head bolts have been hot forged to size or turned from round bar. The first method is very economical when quantity warrants first cost of dies. Drag wire straps are either blanked in dies or sawed to outline in blocks of ten or twelve thicknesses and then pressed so as to cup them to a fit with the spherical underside of the bolt head. After this the round holes are drilled. These simple fittings, by assuring very full end fixity to the drag struts and by eliminating bending moment in the bolt and adjoining spar, also torsion in the joint plates, result in very considerable saving in weight.



The combination of welding and riveting in gasoline tank construction



Above: The aluminum alloy control stick. Sketch shows aileron control torque tubes and housing for the bevel gears actuating these tubes. Below: Aileron control horn showing attachment to torque tube. Note also the aileron hinge



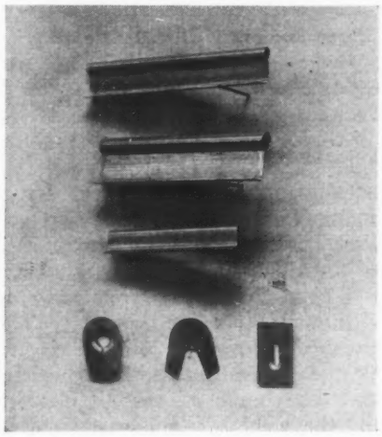
The deep cupping of the strap and the widely separated points on the rim of the cup from which the straps forks lead, cause the line of action of the drag wires to intersect the bolts axis at its bearing on the spar. Tests show that this arrangement fails at ultimate load by shearing of the bolt without perceptible bending. Since the spar joint plates are free from torsion, they, as well as the spar chord, may be lighter.

Bearing of the drag strut fitting upon the upper surfaces of the bolt results in pressing them into perfect contact as loading is applied and, from the resulting friction, a fixing moment exists. This fixing moment increases in direct proportion to the end load and is in fact numerically equal to the continued product of the coefficient of static friction by the radius of curvature and by the end load. The fixing moment for any end load is thus computed definitely. On tests of the drag struts used in these wings this frictional fixing moment

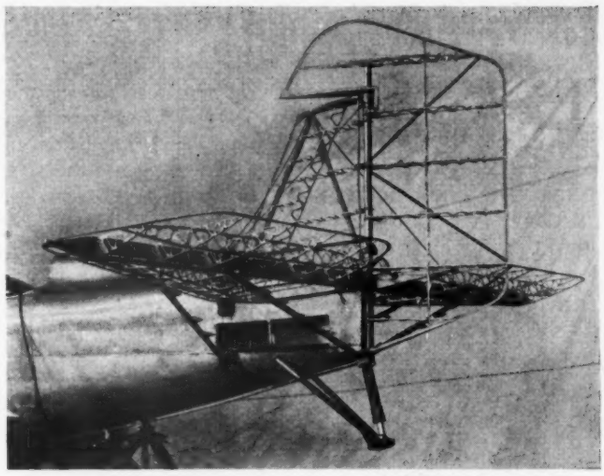
was sufficient to realize a K factor in the Euler formula of the 3 to 3.25, the tubing being only commercially straight. This is a higher factor than can usually be obtained by testing with carefully made flat ends. Under loading, such long struts (1/r ratio = 118) remain practically straight up to the failing load and, when the friction is overcome, they jump suddenly to a curved form and continue to sustain a Euler factor of 1 while so bent. When this load is removed the strut becomes straight and may be reloaded repeatedly with the same result.

The fitting for the lift wire anchorage in the upper wing is also of interest and together with joint plates weighs 1.2 lb. Load in the lift wires is carried through to both flanges of the spar while the drag load is also carried through Y plates and a lower center lug carries the load from the lift struts. The fitting is so designed that a standard wire tie rod terminal barrel can be inserted in the hole and the two wires are screwed into the barrel in such a way as to leave very little of the fitting in the air stream. All lift and drag loads are concentric, passing through one point in the fitting. The barrel arrangement allows the wire to align itself, insuring a straight lead.

The lift wire anchorage on the fuselage is a 17ST forged fitting through which the wires extend and screw into a standard barrel used for strap end fittings. Lock nuts are set against the barrel and do not rest on the sides of the holes in the 17ST fitting. The 17ST forging is riveted to the skin and frames. There is also a tie plate connecting the anchorage on one side with that of the other.



The fuselage is of the monocoque type and is built entirely of Alclad. The transverse frames consist of standard Hall flanged tube drawn sections

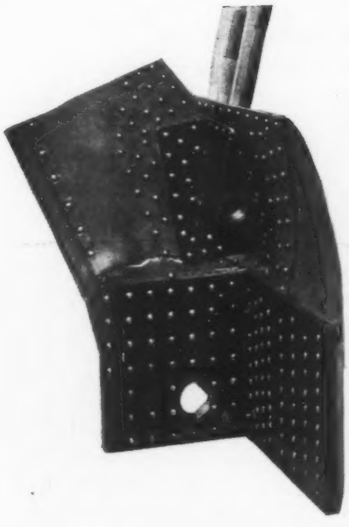


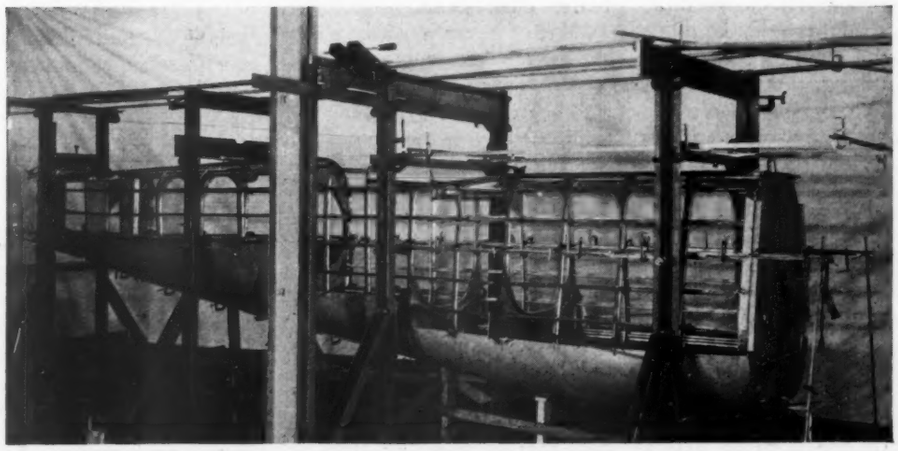
Uncovered empennage members showing single tube spar construction

riveted to gussets and angles formed from Alclad steel. Longitudinal bracing consists of stringers of hollow bulb angle section of standard Hall type passing through the transverse frames. Both the transverse and longitudinal bracing are riveted to the Alclad sheet forming the skin or covering for the fuselage. The fuselage is water tight providing enough buoyancy to float the airplane fully loaded.

Both longitudinal and transverse frames are continuous from end to end. The longitudinal stringers pass through holes in the transverse frames and in the water tight bulkheads. These stringers are made watertight at the bulkheads by a cork inserted in the bulb and by clips riveted to both sides of the bulkhead and to the stringer. The continuity of the transverse frames is maintained by the skin which is riveted to the flanges.

The dimensions of the material used on this fuselage follow. The skin or covering is 0.24 in. thick 17ST Alclad sheet. The flanged "U" shaped reinforcement on wing hinge frames is standard section $\frac{3}{4}$ in. x 0.036 in. 17ST Alclad sheet. On standard transverse frames bulbs are flanged tube sections $\frac{5}{8}$ in. diameter x 0.020 in. thick and webs are 0.028 in. thick 17ST Alclad sheet. The bulbs on wing hinge frames are $\frac{3}{4}$ in. diameter 0.024 in. thick 17ST Alclad sheet flanged tube section, while the webs on these frames are 0.036 in. thick Alclad sheet.

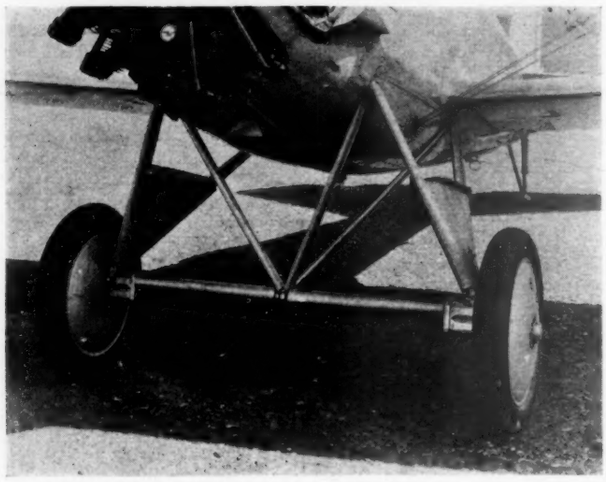


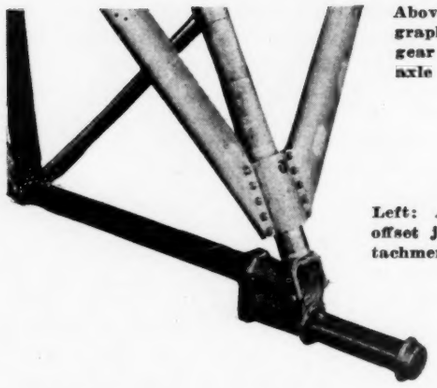


Top Left: Some of the members used in the construction of the fuselage. Left: The result of tests on the lift wire anchorage. Above: The partly completed fuselage structure

Longitudinal stringers are of bulb angle section $\frac{3}{8}$x1$\frac{1}{8}$x 0.020 17ST Alclad sheet.

THE PREVIOUSLY mentioned landing gear release consists essentially of pins in the forward fuselage fitting. These pins may be pulled out from the fitting by means of a lever in the cockpit. This operation causes the front portion of the landing gear to drop free from the fuselage, the rear fittings turning on a ball head bolt until they are clear of the fuselage fitting, after which the entire landing gear will fall. Another feature of the landing gear, necessitated by the use of the airplane on carriers and providing greater deck clearance for the straight axle, is that the wheel axles are offset from the main axle of the landing gear. All struts are 17ST tubing. At the lower end the outboard struts are bolted to a Boeing Oleo member. Inboard struts are connected with the outboard struts at their upper ends. The weight of the landing gear is 149.05 lb.





Above: Detail photograph of the landing gear showing offset axle

Left: A closeup of the offset joint and strut attachment to the axle

AILERONS ARE CONTROLLED by torque tubes, and bevel gears operated by a quadrant. The quadrant is connected to the stick in the cockpit by a cable which runs over pulleys inserted in metal housings. The weight of the gears and their housing is 3.7 lb., that of the torque tube 4.9 lb., while the weight of the quadrant is 3.5 lb. and that of the pulleys and housings is 0.72 lb. The torque tubes are mounted within the wing and the aileron is operated from them by horns. The weight of the horn is 0.08 lb. and that of the link 0.05 lb. Elevators are also operated by horns made of Alclad sheet 0.064 in. thick and bent over to form a channel shape riveted back to back to a similar horn. Both are connected to the torque tube by rivets. The weight of each horn is 0.28 lb.

The control stick assembly consists of the stick which is made from 1$\frac{1}{2}$ in. diameter, 0.049 in. wall, 17ST tube. The upper portion of the handle has been reduced to 1$\frac{1}{8}$ in. by swaging. The weight of this assembly is 1.875 lb. The fittings on the ends of the torque tube are standard swaged hexagonal fittings and illustrate an interesting characteristic of Hall construction.

In cases where it is necessary to join two tubular members and retain their full strength at the joint, a swaged ring fitting is used. This method is also used in cases such as that above mentioned where it is necessary to join tubes to end fittings. A thick wall ring fitting having an annular depression is inserted into the smaller tube which is to be telescoped into the larger tube. Outside of the larger tube a narrow ring of a size sufficient to fit in the depression is placed. The outer ring is then compressed with the two tubes into the depression of the inner fitting. To produce a joint of this type in cases where there is torsion, the inner fitting or ring is of polygonal cross section. Such connections properly proportioned develop the full strength of the tube in compression tension or bending and when failure occurs it is definitely remote from the joint. Joints of this type are not limited in production to very ductile material as might be supposed, but are readily produced in material having specified tensile elongation of 4 per cent in 2 in., merely through appropriate relations between the thickness of the tube, the curvature of the fillets and the depth of the annular depression and also between the diameter of the tube and the length of the ring. A cut through one of these attachments shows no joint unless magnified to 20 or more diameters.

ANOTHER INTERESTING feature is noted in the construction of the gasoline tanks of which there are two each having a capacity of 40 gal. These tanks are made of 0.032 in. Alclad sheet riveted to baffle plates. The longitudinal seams are riveted to a plate inside the tanks and the open edges are welded to insure gasoline tightness. The ends of the tanks are dished for rigidity and are riveted to the body of the tank, the open edges also being welded for gasoline tightness. The heads of these tanks are filled with water while the welds are made preventing any annealing of the rivets or of the material near the rivets from the heat of the welding operation. The weight of the tank with filler neck is 16.9 lb.

The specifications as furnished by the manufacturer:

Wing Span	32 ft.
Overall length	22 ft. 6$\frac{1}{2}$ in.
Extreme height	9 ft. 3 in.
Power plant	Pratt & Whitney Wasp

Detail Weights

Fuselage, engine mount, and cowling	245.02 lb.
Wings, including struts and wires	264.69 lb.
Tail surfaces, struts, and wires	46.97 lb.
Tail skid	15.35 lb.
Landing gear	149.05 lb.
Arresting gear	5.02 lb.
Power plant	944.41 lb.
Fixed equipment	84.69 lb.
Weight empty	1755 lb.
Gross weight	2514 lb.

Saving Weight AT LOW COST

How Much Must We Pay for Increased Payload?

By HORACE C. KNERR
President, Metlab Metallurgical Laboratories, Inc.

HOW TO SAVE WEIGHT without sacrificing strength and safety and without unduly increasing cost is a problem constantly in the mind of every progressive aircraft designer. Advances in the use of metal construction have done much to promote progress in this direction, and are in fact the foundation of success in the larger types of craft.

When steel tubing was first used in the structural parts of aircraft, notably in the fuselage, the only material readily available was the commercial grade known as "cold drawn," which consisted of a low carbon steel containing about 0.12 to 0.18 per cent carbon and no alloying elements. This material was cheap but very heavy because of its low strength. Next came the Army-Navy steel No. 1025, containing 0.20 to 0.30 per cent carbon and made to more rigid specifications as to composition, physical properties and mechanical perfection, with a corresponding advance in cost. The alloy steel, chrome molybdenum, No. 4130X soon followed. This was about 75 per cent stronger than No. 1025 in the normalized state and was only 50 per cent more expensive. It therefore represented a net saving in money as well as in weight for equivalent strength.

Today the demand for still larger savings in structural weight calls for the use of heat-treated alloy steel of high strength. The satisfactory heat treatment of aircraft parts is necessarily a somewhat costly operation because of the delicate nature of the members, the desirability of using electric heat and the close control and skilled supervision needed. This cost would be fully justified by the value of the weight saved in the craft. But, as in the case of the change from No. 1025 steel to No. 4130X steel, the increased cost of the material per pound is offset by a reduction in the quantity of material required.

In purchasing metallic materials, the aircraft manufacturer sometimes focuses his attention upon the cost per pound, overlooking the apparently obvious fact that it is final cost in which he is actually interested. He should recall that where strength of material per pound increases, less material will be required and therefore the cost will be proportionately reduced, while at the same time, a valuable saving in weight of the finished structure will result.

Actual Cost Per Pound of Weight Saved by Using Heat Treated Tubing

Tensile Strength Lb. per Sq.In.	Diameter and Wall of Tube Inches	Actual Breaking Strength in Pounds	Weight Pounds per Ft.	Cost per Foot Including Heat Treatment	Weight Saved per Ft. Pounds	Cost per Pound o Weight Saved
95,000	*1 x.109*	*28,900*	*1.04*	*$4.05*	....	.....
150,000	1 x.072	31,500	.71	.558	.33	$0.465
180,000	1 x.058	30,900	.58	.469	.46	.140
200,000	1 x.049	29,300	.50	.380	.54	—.045*
95,000	*1¼x.120*	*49,500*	*1.77*	*.675*	....	.....
150,000	1¼x.083	55,500	1.25	.825	.52	.480
180,000	1¼x.065	52,750	1.00	.675	.77	.145
200,000	1¼x.058	52,500	.89	.642	.88	.075
95,000	*2 x.156*	*85,500*	*3.07*	*2.85*	....	.....
150,000	2 x.095	85,300	1.93	1.199	1.14	.240
180,000	2 x.083	89,900	1.70	1.080	1.37	.113
200,000	2 x.072	87,200	1.48	1.014	1.59	.056
95,000	*3 x.134*	*114,500*	*4.10*	*1.190*	....	.....
150,000	3 x.083	114,100	2.59	1.637	1.51	.295
180,000	3 x.072	119,200	2.25	1.535	1.85	.187
200,000	3 x.065	119,800	2.04	1.472	2.06	.089

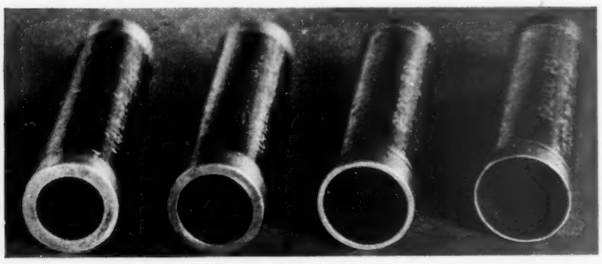
Figures in *italics*—Steel No. 4130X, Normalized.
Figures in roman—Same steel heat-treated by quenching in oil and tempering.
saved.
Costs are based on discount in 500 ft. lots and include charge for heat treating.
Typical examples are given in the table.
* Saved.

This is strikingly illustrated by the simple calculation given below. The assumptions are perfectly true under certain conditions but cannot be applied indiscriminately, for, as is always the case in aircraft design, generalizations are dangerous and each case must be figured individually.

The cost of normalized chrome molybdenum steel seamless tubing of average size and gage used in aircraft construction, and in reasonable quantities, is approximately 30 cents per lb. Some of the small sizes and thin gages are more costly, while some of the heavier sizes are lower in poundage price. Without heat treatment other than normalizing, the strength of the steel is 95,000 lb. per sq.in., minimum. Correct heat treatment will raise the strength to any desired value between 125,000 and 200,000 lb. per sq.in., minimum,

while retaining excellent toughness. The cost of heat treatment, either of seamless tubing in long lengths, or of fabricated parts, in reasonable quantities, may be taken at an outside figure, at 30 cents per lb.

Suppose now that a given aircraft tubular member weighs one pound per foot and costs 30 cents per pound, therefore 30 cents per foot. By heat treatment the



The evolution of steel tubing. Four tubes of equal strength, 1918-21-25-29. Ultimate strength increased from 40,000 to 190,000 lb./sq.in.

strength can be doubled, or raised to 190,000 lb. per sq.in. For the same strength, the tube need now be only half as thick as before. It will therefore weigh only ½ lb. per ft., so that a saving in weight of 50 per cent has been achieved for this particular member. At a heat treating charge of 30 cents per lb., it will cost only 15 cents per ft. to heat treat the tube, making the total cost the same as that of the untreated tube, or 30 cents per ft. One-half of the weight has therefore been saved *without cost.*

Assumptions

	Untreated	Heat Treated
Ult. strength lb./sq.in	95,000	190,000
Weight per foot	1 lb.	½ lb.
Material cost per ft.	30 cents	15 cents
Heat treating cost per ft.	.....	15 cents
Total cost per ft.	30 cents	30 cents
Weight saved	.....	50 per cent
Cost of weight saving	.....	$0.00

It is well known that in certain aircraft parts coming under the head of long columns, the structural strength of the member is determined not by the tensile strength, but by the elastic modulus of the material, so that heat treatment in such cases is of no value and a low carbon steel is as good as a heat treat alloy steel of high strength.

But in a great many instances failure of column members of moderate length occurs in detail, by buckling of the wall. Here the strength produced by heat treatment is highly advantageous and contributes largely to the structural strength of the member. For example, two aircraft struts of streamline tubing were recently tested for the Bellanca Aircraft Corporation. One was in the normalized condition and the other was heat treated to a tensile strength of 200,000 lb. per square inch. The dimensions were as follows: Minor Axis, 1.34 in.; Major Axis, 3.46 in.; Length, 53 in.; Wall, .065 in. They were tested as pin end columns. Failure in both cases was due to buckling of the wall. The results follow:

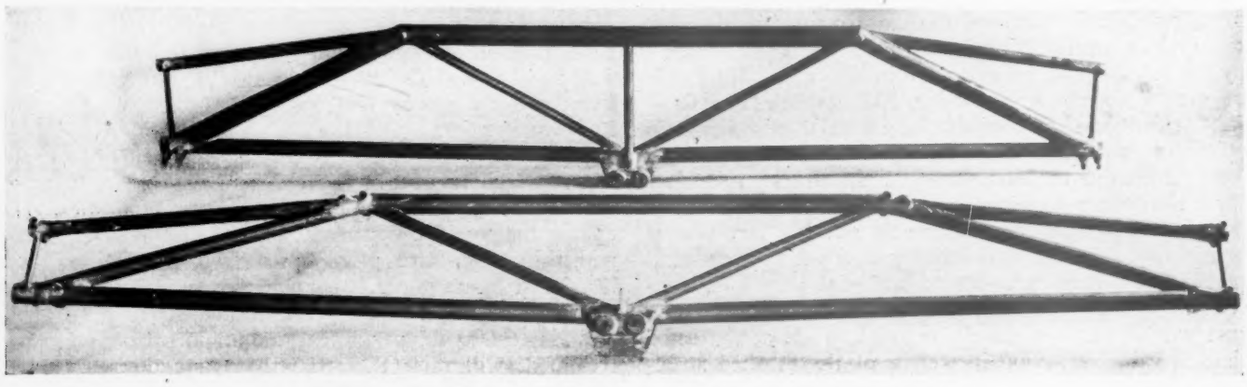
	Normalized	Heat Treated	Gained
Load at elastic limit, pounds	21,000	29,000	37%
Load at ultimate strength, pounds	24,000	31,500	31%

For members in which the principal stresses are tension, compression, or shear, the unit strength of the material is the determining factor.

The cost per pound of tubing ordinarily increases with a reduction in wall thickness, so that a certain increase in the cost per foot accompanies a reduction in weight achieved by heat treating to high physical properties. Furthermore, while a strength of 190,000 lb. per sq.in. can be used in certain parts, such as axles and large tubular sections, there are other parts in which the designer will be more likely to employ values of approximately 150,000 or 175,000 lb. per sq.in. In such cases, of course, the saving in weight will be less than 50 per cent, although still large.

A few examples based on the actual cost of tubing purchased in quantities of not less than 500 ft. and including the cost of heat treatment at 30 cents per lb., have been figured and are given in the accompanying table. Examination of the figures will be enlightening to many who have not heretofore studied the matter from this angle. The cost of saving a pound of weight will be seen to vary from minus 4½ cents (actual net *saving*) to 48 cents, over a fairly representative range of sizes, and stresses.

The value of the saving of a pound of weight in the structure of an airplane is subject to wide differences of opinion. Even the most pessimistic will usually grant that it is worth a dollar to save a pound. An English designer made the classic comment that he would spend a pound to save a pound (meaning, of course, a pound sterling, or $5). Other estimates have been placed as high as $25 a pound. The Army Air Service may, in some cases, apply a penalty of $10 a pound for excess weight on contract jobs. One builder of large planes figures a value of $3 per pound saved. Based on any of these figures, the savings in weight producable by the use of heat treated alloy steel are extremely profitable.



Heat-treated steel wing beams that saved 75 lb. of structural weight

Unit Production versus Assembly of Purchased Units in Aircraft

LOWERING MANUFACTURING COSTS BY Specializing Production

By CHARLES F. MCREYNOLDS
Pacific Coast Editor of AVIATION

AFTER TWO YEARS of intensely rapid growth, during which production has each year doubled over the preceding year's record, the aircraft industry is still widely divided upon basic production problems. There are apparently two schools of thought, one which contends that aircraft are a law upon themselves and should be built complete in one plant, as nearly as this is possible, while at the opposite end of the scale we have those manufacturers who point out that airplanes are assembled from many separate units, each of which presents production problems of its own, and that wherever practicable these should be "farmed out" to organizations equipped to produce them efficiently.

Several Western firms have strongly adopted the latter policy, and notable examples are available of economies effected by this scheme. In some cases the cost of certain units has been reduced to one-fourth of what it was costing the airplane builder to produce the same thing within his plant.

The Golden Eagle Airplane Company, after extensive experiment with a cowling department, has found that it can have cowlings built to specifications at one-third the former cost.

Section of a factory unit devoted to the production of spars and wing assemblies

This company also has found it much cheaper to have wood wing spars routed and finished at the mill, and is planning to let out contracts for the construction of aluminum tanks, and duralumin bucket seats used in the Golden Eagle "Chief." R. O. Bone, president of the Golden Eagle Company, plans to extend this policy wherever possible and hopes to lower production costs by contracting for the manufacture of ribs, undercarriages, flying and engine controls, and other such items, by outside companies. He points out that engines, propellers, tires, shock absorbers, wheel and brake units, instruments, tanks, cabin furniture, hardware and small parts, are all being produced and supplied to the trade by manufacturers who specialize in such lines, and that

it seems logical to hope for the production of completed landing gears, wing ribs, spars, control surfaces, etc., by such organizations, at considerable savings to the aircraft builder.

This plan of dividing production into its component parts and having these turned out, wherever possible, by concerns which specialize in such work, presents possibilities for materially lowering production costs throughout the industry. It is hardly conceivable that a single manufacturer can equip his factory and train his personnel to produce units which involve the working of metal, wood, and cloth, with the various attendant techniques of sewing, gluing, nailing, riveting, brazing, bolting or welding, as cheaply as this work can be done if turned over to organizations already equipped for it and trained to handle it.

Our present industrial progress has been made possible by carrying the division of labor to its highest power. Each of our modern industrial units is dedicated to the solution of some certain production problem, in many cases a factory being devoted to the manufacture of nothing but nails, or bolts, or razor blades, and within each of these factories we know that the work is departmentalized, and within each department, so far as possible, each man is trained to conduct but one operation. The airplane is probably the most complex product now on the market. It has taken the world's best engineering brains approximately 25 years to produce a satisfactory commercial airplane from the first early flying machines. The problems of production engineering are just as involved as those of design engineering, and it is not logical to expect these problems to be solved overnight, nor, to be solved within a single organization. It requires a life time of study to learn how to properly perform certain operations. Also we know that costs are in most cases materially reduced when we multiply the number of times that a given operation is duplicated. Therefore it seems sensible to find aircraft builders turning over certain of their units to manufacturers who are specialists in that particular work, who have studied in great detail the problems involved, and who are turning out such units in quantity lots.

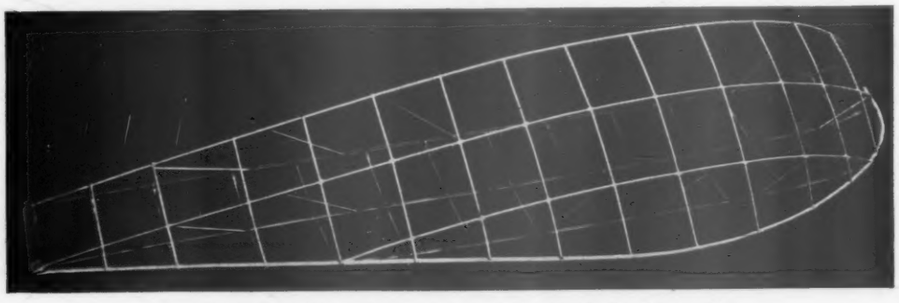
THE HAMMOND LUMBER COMPANY, Los Angeles, has made an exhaustive study of the requirements of aircraft manufacturers, the result of which has been the establishment of an aviation department under the direction of R. H. Minniear. Within this department a crew of men is maintained which does nothing but produce wood parts for aircraft and which is trained to meet the exacting requirements of Department of Commerce inspectors to better advantage than is possible within the small wood working plant which an aircraft builder might maintain. Mr. Minniear has determined that his department can produce the wood parts for the first experimental plane of a new type at approximately one-fourth of what it would cost the manufacturer of the airplane to install his own machinery and do the same work. This cast can be lowered by at least 20-30 per cent where a manufacturer goes into production on a schedule of six planes or more per month. In one case an airplane builder found that the spars alone for a standard biplane were costing him $250 per set after he had equipped his factory for their production. The Hammond Lumber Company produced the same spars to the manufacturer's blue prints for $175 cost to the manufacturer on the first single job and this price could have been materially slashed on a quantity order.

The wisdom of turning over such types of production to the specializing companies is made apparent in this case for if but one or two aircraft builders were to patronize the Hammond Lumber Company it would not be possible to maintain an aviation department. On the other hand, if all such work in the territory served by this company, were to be given to this special department it would be possible to effect great saving at once and pass these on to the price of the completed airplane.

IN PRODUCING wood parts the small aircraft builder is handicapped at a number of points. He must buy his raw lumber in comparatively small lots and pay to have them shipped to his factory by rail, and to have the lumber stored by hand labor. He must select his wood himself and such material as is discarded is likely to prove a total loss to him unless he can find a buyer. Since approximately 90 per cent of all wood used in aircraft is for spar purposes, and since but about 30 per cent of the best spruce available can be used for spars, it is evident that the small manufacturer is faced with a 60 per cent loss. In actual production he must install from $10,000 to $20,000 worth of machinery, much of which will lie idle part of the time, and he must train a crew of woodworkers to perform all the various operations in the wood working department because there will not be enough of any one kind of work to keep one man busy on one machine at all times.

On the other hand, taking the Hammond Lumber Company as typical of the average large lumber wholesaler and miller, we find that this company owns its own timber, saw mills, lumber schooners, storage and handling facilities. Airplane spruce is selected as a matter of routine by company experts at the saw mills. Shipping is chiefly accomplished by means of coastwise vessels and handling is by giant cranes on and off the railroad cars, and in the company's storage yards, eliminating manual labor in every operation. Within the yards this company stores lumber many months in advance of the market and thus properly air dries all stock.

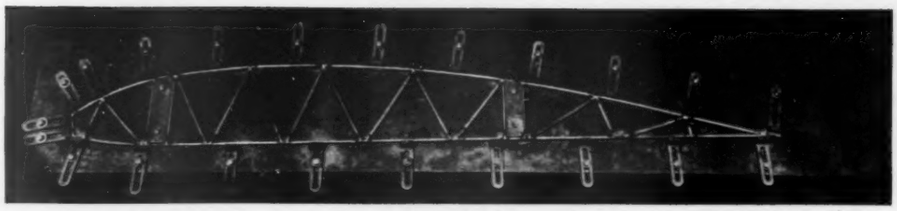
Production is simplified by the fact that all machinery is available in the mills, and because aircraft parts are made in considerable quantities it is possible to specialize the mechanics and to keep the machines busy at all times. Wood not suitable for aircraft use is automatically con-



Unit steel wing tip developed by Aerotrus Products Corporation

verted to parts for motor boats, automobile bodies, furniture, etc., without any appreciable waste.

Another important factor is that the large lumber company can maintain a laboratory and trained engineers to test all grades of wood and render detailed and accurate analyses. Upon the basis of such work it is possible that further economies can be introduced into the fabrication of wood parts, and that strength can be increased with decreased weight.



Aerotrus rib assembly jig adjustable to the production of various types of ribs

Furthermore, when an aircraft factory is on a regular production schedule of a plane a week or more, it is possible for the mill to maintain a stock considerably in advance of the factory's requirements. The advantage of this reserve stock is doubly appreciated if the aircraft builder's planes in service should suffer crash damages requiring immediate repair which involves the replacement of wood parts drawn from stock. If the aircraft builder were forced to maintain this stock it would represent a considerable expense to him.

An additional service which the mill renders is to maintain a reserve stock on important parts of planes which may be widely in use, making it possible for the dealer in that territory near the mill to draw on such stock without being forced to carry the parts in question in stock at his own expense.

Another interesting development is that of the Aerotrus Products Corp., Los Angeles, which turns out steel ribs of various types, bulkheads, wing tips, and control surfaces. Several Western airplane builders have made use of Aerotrus products and W. E. Marchant, president, has announced that an Eastern factory is planned to meet the demand of some of the larger aircraft builders for Aerotrus products.

Wing ribs of riveted stainless steel and of brazed cadmium plated steel are produced by the Aerotrus company and by specializing on the problems involved in this type of work it has been found possible to materially lower costs. Further economies are possible because of the fact that many airplanes use the same chord and wing curve and it is possible to build up a stock of the most popular wing ribs. Where spar dimensions or locations vary it is a simple matter to meet the requirements of an individual company by means of an adjustable master jig which is used in assembly.

As production of the more popular types of ribs increases it is possible that the cost of such ribs can be lowered and that in some cases manufacturers will find it practical to alter their designs sufficiently to install a standard rib rather than to pay a higher price for a rib made to order. The advantage of such a practise from the service standpoint is also apparent.

This brings up the point of standardizing sub units and it is evident that sweeping economies can be effected if such members as spars, ribs, struts, landing gears, wing tips, control surfaces, and other parts, can be standardized to some extent throughout the industry. There are many apparently insurmountable problems to be solved before any such standardization becomes general, but just as all automobiles are built with crown fenders, so all aircraft can incorporate certain common features which will make the quantity manufacture of certain portions of the finished product a more economical pronosition.

A step in this direction has been taken by the Aerotrus company in the development of wing tips and control surfaces. Aerotrus ribs and wing tips have been used in the new Commercial biplane while Aerotrus ribs and control surfaces have been adopted by the Rocheville Corp. While this is a comparatively new field of development, Aerotrus officials report that they can turn out these parts to the manufacturer's requirements for less money than he can build them himself, and that in quantity lots the saving becomes even greater.

The Rocheville Corp. is now testing a new type of wing and if satisfied with the tests plans to manufacture the wing only and supply it to aircraft manufacturers. This wing would make use of Aerotrus ribs and ailerons, other parts of the wing to be fabricated by the Rocheville factory, and it is thought that the completed wing can be supplied at a lower cost than the manufacturers are now paying, because of the concentration upon this one unit.

IN GENERAL it would seem that wherever the production of some unit requires a considerable outlay for equipment, and calls for the exercise of a technique substantially different from that involved in the basic problem of designing and assembling the airplane, that that particular job should be turned over to some organization better prepared to handle it, if there is such a one. Such organizations would not, and do not, depend entirely upon the aircraft industry for support, and changing aircraft designs or practices will not greatly affect the manufacturer of some unit such as tanks, cowling, instruments, or wood parts. On the other hand, where a manufacturer builds his own units he is faced by serious losses if he changes his design. If he buys wood spars from the mill it means only the loss of a comparatively small portion of the mill's total business if he decides to buy metal spars from a metal spart manufacturer. If he builds his own wood spars and decides to develop and build metal spars we know that he must undergo heavy expenses.

The whole problem simmers down to a matter of equipment and experience, and if the experience of these Western concerns is any criterion, it would not seem economical for the average aircraft builder to seek to build up a sufficient quantity of both equipment and experience to meet all of the problems involved in the production of all the units which go into his completed airplane. If we are to attain efficient aircraft production we can well make use of all the knowledge and equipment of all the industries which can be allied with aviation. It seems apparent that the quicker we turn over the problems of metal working, wood working, special structures, tank construction, and many other of the vexing aircraft production puzzles, to those best prepared to solve them, the sooner we may hope for lowered production costs, increased sales, and efficient mass production of aircraft.

GENERAL NEWS

Fechet Cites Lack of Funds

Annual Report Appeals For Air Base Improvements

WASHINGTON (D. C.)—In his annual report to the Secretary of War, Maj. Gen. James E. Fechet, Chief of Air Corps, stated that lack of funds had prevented very necessary changes and developments that should have taken place at many of the air stations. Although appropriations for the year 1930-31 will provide the funds stipulated on the five-year program, the shortage of money which the department has had to put up with for the past four years, will not be rectified before 1931-32.

In the course of his report, Major General Fechet emphasized the need for strengthening the Air Corps reserve, especially the group of pilots who would be the first called upon in case of war. Only 1,500 of the present 5,954 reserve pilots would be qualified for duty, whereas a force of 4,000 should be kept in readiness. Of the 1,500, 900 would require additional training before they could be used in combat service.

Several Developments Reported

Long cross-country flights to places as distant as the Panama Canal Zone are planned for the coming year, to be participated in by bombers, pursuit, and attack units, according to the Air Corps head. These trips will be made in preparation for concentration of air and land forces there in 1931 maneuvers.

In the course of his report, Fechet announced the following developments:

The development of a satisfactory temperature indicator for radial engines has progressed sufficiently to warrant construction of a number of these units.

Fuel system development has consisted largely in improving existing equipment and investigating new pumps submitted by the manufacturers.

Ignition development centered largely upon obtaining a satisfactory method of shielding the ignition system and spark plugs to prevent radio interference.

Describes Hindrances

The use of aircraft radio receivers of greater sensitivity has demanded greater care in shielding aircraft ignition.

General development of power plant installations includes engine controls, exhaust systems, fuel and oil tanks, filter units, oil temperature regulators and smoke signaling apparatus.

Study of engine vibrations and the production of a satisfactory indicating device are being continued.

Below, are some further excerpts of the data furnished, centering mainly on conditions caused by lack of funds:

"Hindrances to training have resulted, due to poor condition of hangars and other essential equipment necessary at flying fields for the purpose of maintenance and protection of aircraft. This condition has become so acute as to be classed as dangerous at some stations, such as Kelly Field, Tex.

"Unless funds are made available for temporary repairs pending the permanent construction proposed in the five-year program, this condition will become worse.

"At Rockwell Field, Calif., no space is available for the storage of bombardment type airplanes, so it is necessary to leave these airplanes exposed to the weather day and night.

"Lack of funds has prevented necessary construction at Fort Crockett, Tex., for the adequate housing of airplanes and equipment of the attack group stationed at that post. It is contemplated increasing this group to its authorized strength. However, this increase will necessarily consist only of an increase in personnel, as no hangar space is available for an increase in the number of airplanes assigned.

More Reserve Flying Asked

"During the last year there has been manifest a greatly increased interest in reserve flying training. Many requests have been received for the establishment of additional reserve airdromes throughout the country. Reserves have used up flying hours allotted them, and many requests have been received for an increase in hours.

"All the airplanes that the five-year program allows for reserve training, have been allotted. The five-year program makes no allowance of service airplanes for this training. This type of airplane is very essential, however, as reserves cannot be taught military flying without them. In view of the increased civilian facilities for ordinary flying and due to the fact that a majority of air reserves will be engaged in civilian flying, it is important that service type equipment be furnished for reserves.

"A new system of classifying reserves according to their flying efficiency has been put into effect. This system calls for a monthly report showing the physical, flying and professional status of every active reserve officer. The report also shows the amount and type of flying engaged in by reserves each month.

"These reports disclose that, although there are 5,954 reserves in the Air Corps, only about 1,500 of these are qualified for flying service. Some 600 of this 1,500 are qualified for immediate service; the remainder require further training before they could be used in tactical units for combat service.

"When it is considered that approximately 4,000 Group 1 reserves are required, it is apparent that the Air Corps is far below the strength necessary to make it effective from a national defense standpoint. Every effort should be made to build up the Air Corps reserves. This can be done by the adoption of a more comprehensive reserve training system.

"National Guard—National Guard air units are being gradually being brought up to their authorized strength in pilots and observers. Those units now have 80 per cent of their authorized pilots, 70 per cent of which have grouped classification. The squadrons also have 50 per cent of their authorized observers. However, some of these are not rated."

Added Hours; Fewer Mishaps

WASHINGTON (D. C.)—According to figures released in the annual report of the Chief of Air Corps, Maj. Gen. James E. Fechet, the more hours in the air you have, the better your chances are of escaping mishaps.

Pilots who fly 50 to 100 hr. yearly, run only half the chance of an accident as do those whose flying hours are less than 50 each twelve-month. In the course of the report, it was also stated that there had been a marked reduction in the number of mishaps traceable to mechanical causes.

Oregon Air Board Plans Changes in Law

PORTLAND (ORE.)—Plans for amending state aviation laws so as to give more adequate protection to human life, are being made at a series of conferences of the state board of aeronautics. Laws of the state are sufficiently stringent so far as pilots are concerned, but do not provide for close enough supervision over planes.

Members of the board are Tex Rankin, Lieut. Basil B. Smith, and Lieut. A. B. Mackenzie, all well-known fliers. Capt. Wiley Wright, federal inspector; Governor Patterson, Att. Gen. Van Winkle and Dave O'Hara, representing the secretary of state, participated in the first meeting in Salem.

The situation was critical, members of the board said. Unless the Oregon laws were made at least as strict as those of the Department of Commerce, lives might be lost. The state now has an airplane license law but does not provide for adequate craft inspection.

It was hinted at the meeting that a certain dealer distributing an unnamed type of craft, would be called before the board next meeting to explain sales of planes that have been barred from California, Washington, Idaho and other states. The board members would not make public the names of either the dealer or the plane. Manufacturers and state officials are to attend the next conference.

Plan Eight-State Parley in Ohio

DAYTON (OHIO)—It is probable that the eight-state legislative parley at which plans for uniform aviation laws will be discussed, will be held here some time this month, according to a recent announcement. The states to be represented are Ohio, Illinois, Michigan, Minnesota, Iowa, Wisconsin, and North and South Dakota. Assemblyman Harry G. Slater, secretary of the committee and author of the Wisconsin air code, is instigator of the conference.

Martin Firm Bond Issue Of $3,000,000 Released

BALTIMORE (MD.)—The Glenn L. Martin Company has increased its capitalization by the issuance of $3,000,000 five-year 6 per cent convertible debentures to finance in part, the completion of the equipment of its airplane plant at Middle River. The only other outstanding capital obligation, is 525,000 shares of common stock of no-par value. The debentures have been underwritten by the Baltimore Trust Company and out-of-town bankers.

The company's new plant is working on government contracts sufficient to keep it busy for nine months of the coming year. Officials declared the Baltimore factory is designed as the initial unit of a proposed plant of triple its present capacity, which will take care of a volume of business in excess of $8,000,000 annually. This initial capacity is approximately three times that of the Cleveland plant, which was sold for cash before the company transferred its operations to this locality.

Expansion of the scope of activities is to be realized by adding to the present manufacture of bombers, patrol planes and other aircraft for the government, such lines as all-metal aircraft of the light training and sport type, flying boats and large planes of the commercial transport type. The company also has begun to manufacture through a 90 per cent owned subsidiary, a four-cylinder air-cooled engine, particularly adapted for use in light planes.

Million Transported by Plane

NEWARK (N. J.)—A plane temporarily in the millionaire class landed at the Newark Airport the other day, with Carl LeFevre carrying that amount via plane from Philadelphia to the brokerage firm of C. Clothier Jones & Company, New York. The company, of which LeFevre is a member, needed the money quickly—and the Philadelphia train had already left. Ewing W. Day, Jr., piloted the plane furnished by Ludington-Philadelphia Flying Service.

Nicholas-Beazley Issues Report

ST. LOUIS (MO.) — Balance sheets show net profits of the Nicholas-Beazley Airplane Company, Inc., for the first six months of this year, were $87,828.91. Officials state the receipts would have been larger, but for the expenses entailed in building new plants and procuring additional equipment.

Six Travel Airs for C.A.S.

WICHITA (KAN.)—Travel Air Manufacturing Company, this city, has built five six-place monoplanes for Continental Air Services, Inc., Chicago, which plans to use the craft on a new transport line between Chicago and New Orleans. A sixth Travel Air may be taken by Continental, it is further stated.

General Property Sold for $65,000

BUFFALO (N. Y.)—Sale of the entire property and assets of the General Airplanes Corporation, defunct, which included ten finished planes and about fifteen under construction, and designs and patents, took place here recently. H. Paltrowitz, New York City, treasurer of the Marine Metal and Supply Company, bought the property for $65,000.

Expect 40 Planes In Baltimore Show

BALTIMORE (MD.)—Thirty planes have already been entered in the Baltimore Aircraft Show and it is expected that at least 40 will have been entered when the show opens Dec. 9.

The entry of the Davis Aircraft Company of Richmond, Ind., the Davis D-1 will be flown to Baltimore by Capt. Wm. C. Davis, president. The Fairchild Airplane Manufacturing Company of Farmingdale, L. I., has entered its complete line of five planes while the Curtiss Flying Service of the East has entered eight planes which it either manufactures or represents.

A surprise is offered in two entries of the Icarus Airplane Works, Baltimore's newest aircraft manufacturer. One is reported to be a twin engined transport monoplane with a wing span of 66 ft. and the other, an observation biplane, with a wingspan of 30 ft.

The Guggenheim Fund for the Promotion of Aeronautics, New York, will loan a valuable collection of early airplane prints. Special days of show week will have programs arranged by the Rotary Club of Baltimore, the Baltimore Association of Commerce, the Advertising Club of Baltimore, the Engineer's Club, and the Flying Club of Baltimore.

Civil Service Post Open

WASHINGTON (D. C.)—Applications for the post of an assistant technical review editor (foreign), are now desired by the Civil Service Commission here and must be on file with that body not later than Dec. 31, 1929. A vacancy in the Material Division, Air Service, War Department, for duty at Wright Field, Dayton, Ohio, is the one to be filled. The work partly consists in the compilation, editing, and dissemination of information in foreign language, received in this country. Detailed information may be received by writing to the Commission or the secretary of the United States Civil Service Board of Examiners, or may be had at post offices and customhouses.

Girls Replace Men in Ryan Unit

ST. LOUIS (MO.)—Girls have entirely replaced men in the wing and fuselage covering department of the Ryan aircraft factory. The firm has decided that women are better than men for this type of work.

Dr. Dornier Arrives

DR. CLAUDE DORNIER, designer and builder of the world's largest seaplane, the Do.X, which recently carried 169 persons aloft over Lake Constance, Switzerland, is shown above as he arrived in this country aboard the S.S. Olympic Nov. 20. He is here to confer with officials of the General Motors Corporation and Fokker Aircraft Corporation of America concerning plans for the manufacturing of his line of flying boats in the United States. It will be recalled that negotiations for this project were begun some months ago.

Work is to begin shortly, it is announced, on the erection of a large plant, with several sites already under the consideration of the Dornier Corporation of America. Considerable material initially will be imported from Germany, but it is planned to ultimately manufacture the Dornier line completely in the United States.

The Dornier Wal, two-engined, and the Super Wal, four-engined, will be the first types produced, while it is stated that future plans include the manufacture of the large twelve-engined Do.X model.

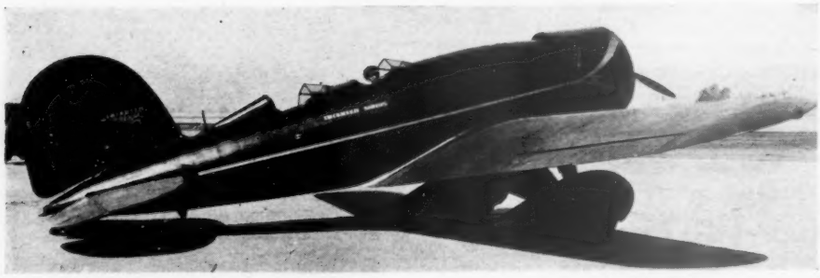
Dr. Dornier will be in this country until mid-December on this visit. He plans to return early in 1930 when the project will be definitely under way.

Anacostia Gets British Plane

WASHINGTON (D. C.) — Anacostia Naval Air Station has just received a Bristol "Bulldog," a single-seater, all-metal, fighting plane, manufactured by the Bristol Aeroplane Company, Ltd., of Bristol, Eng. The Navy Department announces the craft will be used for experimental purposes.

TACOMA PUBLIC LIBRARY

Lockheed Low-Wing Completed for Lindbergh



SUCCESSFUL TEST FLIGHTS have been concluded by W. N. Harper, Lockheed factory test pilot, of the low-wing Wasp powered Lockheed recently ordered by Col. Charles A. Lindbergh. This plane is essentially the same type as that ordered by Bromley for his proposed trans-Pacific flight non-stop from Tacoma to Tokio, Japan. Lindbergh's plane presents many minor refinements over the first low-wing Lockheed, the details of which have been closely guarded by the factory. In general the plane does not differ from standard Lockheed construction, except that the wing is mounted beneath the fuselage.

The standard Lockheed fuselage is used, but wing spread has been increased to accommodate a greater fuel load. The new Lindbergh plane is said to provide sufficient fuel capacity for a 4,500-mi. non-stop flight. There are two open cockpits in rear of and above the wing, each with separate controls.

An especially complete instrument board, furnished by the Pioneer Instrument Company, of Brooklyn, N. Y. has been fitted in the front cockpit, with an altimeter, speed, and climb indicator in the rear cockpit. The plane has been fitted and finished throughout as a de luxe long distance craft, and it is thought that the Colonel and his wife will use it a great deal in business and pleasure trips planned for the future.

Barber Underwriters To Conduct Sales Survey

NEW YORK (N. Y.)—Barber & Baldwin, Inc., aviation insurance underwriters, will conduct a survey of the aircraft sales field through the Aero Engineering & Advisory Service, Inc., which it has directed to do the work. The investigation will take place for the next three months.

In announcing the survey, Mr. Barber said: "It is generally admitted by members of the industry, as well as its bankers and investors, that aviation needs to create a greater market for its products. Anticipated buyers have failed to materialize in substantial numbers. With few exceptions, adequate analysis of potential fields has been lacking and no well defined sales plan has been effectively developed."

Horatio Barber, president of Aero Underwriters Corporation, recently sailed for Europe for the purpose of establishing an organization abroad, due to the increased foreign business of Aero Insurance Company, Aero Indemnity Company, the underwriting firm of Barber & Baldwin, and the Aero Engineering Company, subsidiaries of the corporation.

Erect Norma-Hoffman Addition

STAMFORD (CONN.)—An $8,000 plant addition is being erected here by the Norma-Hoffman Bearings Company, manufacturers of ball and roller bearings for airplanes and automobiles.

Plane Exports Total 275 for '29

WASHINGTON (D. C.)—During the first nine months of this year, $4,397,311 was the value of 275 aircraft exported as compared to 162 planes exported for the whole of last year, valued at $1,759,653. By the end of 1929, it is expected the ratio of exports to production will have been doubled over the previous twelve months. The 275 planes were distributed to 23 foreign countries, of which twelve were Latin-American. Fifty-nine per cent of all the exports of complete aircraft went to Cuba, Central America, and South America. Mexico and Chile displaced Canada for the first nine months of this year, as the leading purchaser. This is, in part, said to be due to the assembly of American craft and parts in Canadian factories.

Travel Air Base for South Africa

WICHITA (KAN.)—Travel Air Manufacturing Company of Wichita is to open a distributing agency in South Africa in competition with European firms. Newman Wadlow, 22, a Travel Air test pilot, will sail from New York on Nov. 30 with two planes for Capetown, where the agency is to be opened by Jan. 1. One of the demonstrators which Wadlow will fly extensively over African territory, will be a six-place cabin monoplane and the other a three-place open biplane. Wadlow, upon whom rests the responsibility for the foreign showing, was the youngest pilot in the National Air Tour.

U.A.T. Propeller Firms Now Hamilton Standard

MILWAUKEE (WIS.)—The Hamilton Aero Manufacturing Company, of this city, and the Standard Steel Propeller Corporation, of Pittsburgh, have been consolidated into the Hamilton Standard Propeller Corporation, a subsidiary of United Aircraft and Transport Corporation.

Officers of this new firm include: Thomas F. Hamilton, chairman of the board; Harry A. Kraeling, president; E. E. Wilson, vice-president; August H. Vogel, vice-president; Arvid Nelson, secretary, and Thomas J. Ingram, treasurer. Among the directors are W. E. Boeing, chairman of United Aircraft and Transport Company; Frederick B. Rentschler, president of United Aircraft and Transport Corporation and of Pratt and Whitney; and J. H. Hillman, Jr., chairman of the board of the Peoples-Pittsburgh Trust Company.

Following unification of the two companies, plans are being made for the enlargement of the engineering and research departments for the purpose of improving the performance of existing designs and developing new ones. Courses for speed testing are available at both Milwaukee and Los Angeles.

Los Angeles is now the location of a factory branch and service station and a varied stock is carried there. To facilitate repairs under expert supervision, complete heat-treating and straightening equipment is being installed. Additional branches are being contemplated for various other strategic points.

The existing price list, as issued by the Standard Steel Propeller Corporation in June of this year, is still in effect, according to the announcement.

Miss Earhart Sets Record

LOS ANGELES (CALIF.) — What is claimed to be a new speed record for women was established here on Nov. 22 by Amelia Earhart, trans-Atlantic pilot. Over a mile course at the Metropolitan Airport, she averaged 184.17 m.p.h. over the four laps, being clocked at 197 m.p.h. on one the laps by Joe Nikrent, timer for the American Aeronautical Association. Mrs. Louise Thaden of Pittsburgh, is said to have held the former record, 156 m.p.h. Miss Earhart made the flight in a Wasp-powered Lockheed Vega monoplane.

Seek New N. Y. Altitude Law

NEW YORK (N. Y.)—Following an airplane crash in the heart of the city recently, Grover C. Whalen, Police Commissioner, is planning to introduce an ordinance which would prohibit flights over the city at altitudes of less than 7,000 to 10,000 ft. He also wishes to introduce a law which would keep all but professional fliers from circling the city.

Safe Plane Contest Entry List Narrows

MITCHEL FIELD (L. I., N. Y.)—But seven planes—or a possible nine if the damaged Schroeder-Wentworth and J. S. McDonnell, Jr., craft are repaired for further tests by Dec. 1—now remain in the Guggenheim Safe Aircraft Competition under way at this field.

These seven planes are as follows: Handley Page, Curtiss "Tanager," Bourden "Kitty Hawk," Ford-Leigh Safety Wing, Cuningham-Hall, Burnelli, and the Taylor Brothers craft. The Command-Aire and Fleet planes were withdrawn a short time ago from the contest, leaving eight in the field. A ninth plane, however, was added when the J. S. McDonnell low-wing entry arrived at the Guggenheim base here.

In a trial flight Nov. 21, the Schroeder-Wentworth plane crashed—with Major Schroeder extricating himself from the damaged machine to say: "Well, I set out to build a safe plane, and I'm safe even in a crash, so that's something." The plane had fallen off on one wing, thus bringing the machine into a spiral from which it did not recover. The wing and fuselage of the plane were injured in the impact. The machine had not yet passed the qualifying tests of the contest.

The following day, the monoplane developed by J. S. McDonnell, Jr., of Milwaukee, also crashed, when, according to reports, the stabilizer broke while McDonnell was in flight above the field. Disdaining to use a parachute, he brought the craft to the ground without injury to himself, though the propeller, one wheel, and the machine's right wing were damaged, according to reports. This plane, like that of the Schroeder-Wentworth firm, had not yet been tested for qualification in the safety contest.

Site of 1930 Races Uncertain

WASHINGTON (D. C.)—According to Fred R. Neely, secretary of the National Aeronautic Association, no definite decision has yet been reached as to where the 1930 National Air Races will be held. In an earlier edition, AVIATION had stated that Chicago had been awarded the event. This has been neither officially denied or affirmed since then. Recent bidders for the classic include Springfield, Mass., and Camden, N. J.

To Tour South America in S-56

PORT WASHINGTON (L. I.)—A tour of South American cities in a Savoia-Marchetti S-56, is being planned by Pilot Gerald Gjoerloff, accompanied by Leonard Ludwig, of the Great Lakes Aircraft Corporation. The craft will be shipped by rail and water to Rio de Janeiro, where the remainder of the trip will be accomplished by plane. This flight is to be made in the interests of South American aviation.

Thirty-Six Ryans in Use Abroad

ST. LOUIS (MO.)—Ryan Aircraft Corporation reports that a total of 36 Ryan Broughams have been purchased for operation in foreign countries. Planes of that company are being used in China, New Guinea, Australia, Japan, England, Argentina, Guatemala, Mexico, Canada, Italy, and Alaska.

Two Cities Ask "Lexington's" Aid

WASHINGTON (D. C.)—Use of the airplane carrier "Lexington's" 215,000 hp. turbine plant, has been requested by the cities of Seattle and Tacoma, Washington, following a threatened shortage of hydro-electric power in those cities after a severe drought.

The request was forwarded by Rear Admiral Ziegemeir, commandant of the Bremerton Navy Yard, and suggested that the ship be docked at Tacoma and the generators connected to the municipal power lines. (With the ship about to sail, the request has been denied, late reports state—Ed.)

Earnings $2,205,550, North American Reports

NEW YORK (N. Y.)—In a report issued by President C. M. Keys, a total income of $2,205,550 was shown for North American Aviation during the first nine months of 1929. After subtracting expenses, which totaled $129,536, and reserves for federal taxes amounting to $242,094, the sum of $1,833,920 was available for the 2,000,000 shares of no-par value stock outstanding.

A letter sent to stockholders, contained this statement by Mr. Keys:

"In view of the current decline in market values of securities we have considered it advisable to inform you of the present book value of your stock. We have valued all of the investments owned at closing market prices on Nov. 15, 1929, and find that, after providing for all contingent liabilities, your stock had a book value on that date of 10.06 per share."

The balance sheet on Sept. 30 shows total assets of $27,087,230. This total included cash and call loans of $7,076,471. Open market securities carried at cost in the balance sheet aggregated $11,415,374, whereas the market value of these securities on Sept. 30 was $9,249,864. Other investments totaled $8,036,303 and syndicate participation $551,192. Accounts payable totaled only $2,357 and earned surplus on Sept. 30 amounted to $1,842,779.

NEW PLANES

Test flights of the first plane built by students of the Aviation Engineering School, New York, are announced.

Called the Pheasant Traveler, a one-place machine developed by Pheasant Aircraft Company, Fond Du Lac, Wis., was lately dedicated at the airport there during ceremonies attended by Gov. Walter J. Kohler.

Successful test flights have been held on the Moreland M-2 training monoplane, a product of the Moreland Aircraft Company, Los Angeles, Calif.; and on the Courier monoplane trainer, built by the Courier Monoplane Company of Long Beach, Calif. Both planes use Kinner power. The Moreland is of parasol type and dual-controlled. A rigid tripod landing gear carries Goodyear Air Wheels. The Courier craft has been so designed that wing panels, and struts, landing gear, and tail surfaces are interchangeable with those Courier three-place monoplane.

The new Ogden Osprey, tri-engined, six-place, cabin monoplane, powered with three Cirrus Mark 111 engines, will soon be ready for first flights, according to reports. The machine was designed and constructed under direction of Lieut. Henry H. Ogden, round-the-world flier, now president of the Ogden Aircraft Company, Los Angeles.

Northrop Aircraft Corporation, Glendale, Calif., is soon to start construction on an all-metal plane whose features have not been made public. Work on it is waiting upon completion of the firm's $75,000 plant at United Airport, located on the outskirts of Los Angeles.

A small low-wing monoplane has been developed by Albert J. Downs, of Wenham, Mass., which he hopes to manufacture under the name of Stabilaire, Inc. The wings of this small plane are supported by two external braces, leading from the top of the fuselage.

U. of M. Men Can't Pleasure-Fly

ANN HARBOR (MICH.)—Michigan University students are to be prohibited from piloting planes on pleasure flights, according to an announcement made by W. B. Rea, assistant to the dean of students. However, a student engaged in commercial flying or taking a flight course, may obtain a special permit for those activities. This is said to be the first college ban ever instituted on planes, many seats of learning having already prohibited students from using automobiles on the campus.

Midwest Airways Holds Parade

MILWAUKEE (WIS.)—Under the auspices of one of the city newspapers, Midwest Airways, Inc., recently staged an airplane parade through the business section of Milwaukee. Fifteen planes taxied through the streets under their own power to draw attention to an aviation week designated to promote interest in the new municipal airport.

Aero Products In N.S.P.A. Show

Nearly 90 Firms Exhibit Aviation Devices at Detroit

DETROIT (MICH.)—Exhibiting to a satisfying, if not a marked degree, sufficient aeronautic accessories to testify to their faith in aviation, the National Standard Parts Association, primarily an automotive products organization, recently closed a five-day annual convention and show here.

The exhibition, declared the largest of its kind ever held, is estimated to have attracted approximately 6,500 members. A total of 205 exhibitors, nearly 90 of whom are manufacturers of at least one product for the aeronautic industry, subscribed to 100,000 sq.ft. of the 155,000 sq.ft. available in Convention Hall, where the All-American Aircraft Show has been held the past two years.

Although, as stated, the National Standard Parts Association is devoted principally to the automobile field, a number of the exhibitors—whose names and trade-names have become by-words in the aeronautics industry—devoted considerable of their space to the display of aviation products. Inasmuch as the Detroit show was the first held since the organization became officially active in aircraft work, the showing here is looked upon as but a semblance of what the airplane industry can expect in the Association's future annual expositions.

Membership Now 428

The National Standard Parts Association staged its initial exhibition in 1924, having at that time 88 members, all manufacturers or jobbers of automobile parts. In 1927 it had 276 members having taken into its fold manufacturers and jobbers of garage equipment and service tools. Manufacturers and jobbers of maintenance materials were taken in in 1928, increasing the membership to 366. Its present membership, 428, includes the aviation by-products field, which was admitted to its rolls during the past year.

W. E. McIlroy is president of the N. S. P. A., R. A. Kiken, vice-president; E. P. Chalpant, executive vice-president; Robert MacFee, secretary; T. O. Duggan, merchandising service director; and H. J. Moore, manager of publicity; George Newbold, of AVIATION, is advisor to the organization's aeronautics committee. Headquarters are in Detroit.

Following is a list of exhibitors at the Detroit show who are purveyors to the aircraft industry, and most of whom displayed their aircraft products in the show:

The Accuralite Co., Parts Mfg. Co., A. C. Spark Plug Co., Allbestos Corp., Aluminum Industries, Inc., American Bosch Magneto, American Hammered Piston Ring Co., Apco Mossberg Corp., Aurora Equipment Co., Automotive Specialty Corp., Belden Manufacturing Co., Berry Bros., Inc., Black & Decker Mfg. Co., Bonney Forge & Tool Works, Bunting Brass & Bronze Co., Burgess-Norton Mfg. Co., Chadwick & Trefethen, Champion Pneumatic Machinery Co., Champion Spark Plug Co., Clayton & Lambert Mfg. Co., Crane Packing Co., Continental Rubber Works, Dall Motor Parts Co., DeLuxe Products Corp., Detroit Steel Products Co., Duoflex Piston Ring Co., Emsco Asbestos Co., Evans Flexible Reamer Corp., Fafnir Bearing Co., Federal-Mogul Corporation, Felt Products Mfg. Co., Fitzgerald Mfg. Co., Fleming Mfg. Co., W. D. Foreman, L. H. Gilmer Co., Greenfield Tap & Die Corp., Guaranteed Parts Co., Inc., Hastings, Mfg. Co., Hempy-Cooper Mfg. Co., W. B. Huber & Co., Hutto Engineering Co., Johns-Manville Corp., Johnson Bronze Company, Kant-Rust Products Corp., Kellogg Mfg. Co., Keystone Reamer & Tool Co., Kraeuter & Co., Inc., Liberty Engineering Corp., F. A. Luthy Co., Marquette Mfg. Co., McCord Radiator & Mfg. Co., McQuay-Norris Mfg. Co., Moto-Meter Co., Inc., Norma-Hoffman Bearings Corp., Ohio Piston Co., Packard Electric Co., Pep Mfg. Co., Perfect Circle Co., Permatex Co., Inc., Pratt Chuck Co., Wm. E. Pratt Mfg. Co., Pyrene Mfg. Co., Ramsey Accessories Mfg. Co., Raybestos Co., Red-Line Reamer Co., Reiff & Nestor Co., Richmond Hammered Ring, Russell Mfg. Co., S K F Industries, Spencer-Smith Machine Co., C. Spiro Mfg. Co., Splitdorf Electrical Co., Thermoid Rubber Co., Thompson Products, Inc., Timken Roller Bearing Serv. Co., Torrington Co., U. S. Electric Tool Co., Van Dorn Elec. Tool Co., Van Norman Machine Tool Co., Vellumoid Co., Watervliet Tool Co., Inc., Watkins Rebabbitting Service, Wel-Ever Piston Ring Co., Westinghouse Lamp Co., Whitaker Battery Supply Co., Wilkening Mfg. Co., J. H. Williams & Co., World Bestos Corp.

McCloud's Adjustable Propeller Flight Tested

LOS ANGELES (CALIF.)—Successful flight tests have been conducted at the Aero Corporation of California flying field, in this city, with the new McCloud reversible and adjustable pitch propeller mounted on a standard Wasp-powered Super-Universal Fokker. The propeller is mechanically adjusted for pitch through a system of gears and chains operating through a sliding collar that revolves with the air screw. A pair of compensating weights mounted one on the base of each blade, serve to eliminate vibration and uneven operation of the propeller due to the incorporation of the mechanical adjusting feature, and automatically move the blades to a normal pitch in case of failure of the adjusting mechanism. This propeller and the Hodges electric starter exhibited at the Western Aircraft Show are to be placed on the market at once by Mr. McCloud and his associates, among whom are included prominent officials of the Richfield Oil Company. The Hodges starter has undergone several months of successful operation for test purposes. It is said to be quite light in weight.

Offer Pioneer-Waltham Clock

BROOKLYN (N. Y.)—Called the Pioneer-Waltham, an aviation clock has been specially manufactured for the Pioneer Instrument Company here by the Waltham Watch Company. One of its features, is a set of red hands which are adjusted by the pilot when he takes off. Then at the end of the flight, he need but subtract the time record by the red hands from that of the moving hands, in order to tell the duration of his trip. This watch is manufactured in two types, which sell for $40 and $50, respectively.

Universal Announces An Extension Course

ST. LOUIS (MO.)—Universal Aviation Schools has prepared an extension course, designed to meet the needs of students unable to take advantage of ground and flight training at the present time. Instructors and officials have spent some eight months and more than $16,000, it is declared, in preparing the course, which is now issued in 40 loose-leaf books so new insertions can be made at any time. The studies, illustrated with line cuts and photographs, make it easy for pupils to follow the work step by step.

If a student later cares to take flight instruction at a Universal School, he may apply the entire amount he paid for the course to his further training. L. A. Miller, former general manager of the Porterfield Flying School, now a Universal unit, has been made director of the extension division.

Willis B. Haviland, Director of the Universal Flying Schools, a branch of Universal Aviation Corporation, declares the work is in no sense a "correspondence course," but is designed for home consumption and contains practically every feature of the work with the exception of actual ground training.

The line of study covers aerodynamics, aircraft engine principles, engine types, construction and design, navigation, meteorology, map reading, business training, materials used in construction, maintenance and inspection of aircraft and engines, aerial photography and map making, problems of future development, history of aviation, commercial aviation, aviation salesmanship, insurance and law, aviation organization structure, airport management, airplane sales and financing, and air commerce regulations.

Form Illinois Commission

SPRINGFIELD (ILL.) — Two wartime fliers, two state senators, and two members of the lower house of the Illinois general assembly, comprise the Aerial Navigation Commission, a newly created body to govern aeronautic matters in the state, appointed last week by Gov. Louis Emmerson. Maj. Reed Landis, secretary of the Chicago Aero Commission, became chairman of the group; Howard C. Knotts, Springfield. Sens. Lowell E. Mason, Chicago, and Richard R. Meentz, Ashkum; and Rep. Charles H. Weber, Chicago, and E. C. Wilson, Kankakee, are the members.

Training for Cessna Salesmen

WICHITA (KAN.)—As after the first of the year, Cessna will handle the sales of its own planes, the Cessna Aircraft Company is training its salesmen to become pilots. One of the first to receive flying instruction is Otto Taylor, who has been enrolled at the Wichita Flying School and uses a four-place Cessna for his flights.

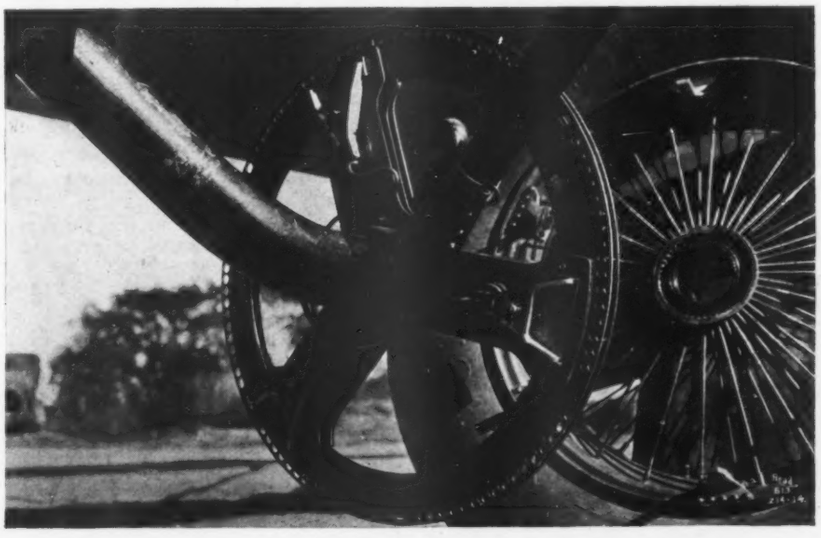
Multiple Disc Brake Devised by Sikorsky

BRIDGEPORT (CONN.)—Early in 1929, the engineering department of Sikorsky Aviation Corporation began a series of tests and studies to develop a brake suitable for large planes, particularly large amphibions. The Multiple Disc Brake, now in production and being applied to all Sikorsky amphibions, is the direct result of the work. It is stated by the firm that landings within a space of 300 ft. are enabled with the device.

There are three stationary plates, the outside and inside plates having brake lining riveted to one side only, while the center plate has brake lining riveted on both sides. The duty of the arms of those stationary plates is to support the brake lining and to carry the braking torque to the axle. These plates are .062 in. thick and will carry safely to the axle a torque in excess of 25,000 in. lb.

In the cockpit of the Sikorsky amphibion, and located between the rudder pedals, are two hydraulic cylinders operated by brake pedals. These cylinders are connected down to the axle through flexible hose and thence to one cylinder on each of the three sets of stationary arms. This makes three cylinders to each wheel. All cylinders are connected together on each wheel so that they work together, and when pressure is applied to the pedal in the cockpit, hydraulic pressure is applied to all cylinders on each brake, and the pistons are caused to travel outward.

Both the cylinders and pistons are connected through locking levers so that the outward force of the cylinders and pistons result in an inward pressure, tending to clamp the three stationary arms and the two rotating rings together. The rotation of the wheels causes the rotating rings to turn, and the rings being clamped between the brake lining on the ends of the stationary members, a strong resistance to rotation is set up, which is carried down to the axle and thence into the hull. In order to avoid nosing over the wheels have been moved slightly forward.



The Sikorsky Multiple Disc Brake. The landing wheel has been removed to show the operating parts

Air Heads to Discuss Gliding

NEW YORK (N. Y.) — Aeronautical leaders will meet here Dec. 5 to discuss the glider situation as it affects the airplane market and to stimulate interest in the National Glider Association program. This was declared by William P. MacCracken, Jr., former Assistant Secretary of Commerce for Aeronautics, and a member of the National Advisory Committee for Aeronautics. He will be chairman of the meeting, which will be held at the Ritz Carlton and be preceded by a banquet.

Bendix Aviation Plans Additional Developments

SOUTH BEND (IND.)—According to Vincent Bendix, Jr., president of the Bendix Aviation Corporation, the firm is planning developments and expansion along many lines, one of the first of which will be the addition of 1,600 men to the payroll shortly after Jan. 1, by which date, it is expected to have a new plant finished.

Speaking of the plans, Mr. Bendix declared the company's aviation wheel and brake factory will be moved from Dayton, Ohio, to this place as rapidly as facilities for receiving that business are completed. He also told of the acquisition of several concerns in France, England, and Germany, and procuring some automotive development in this country.

Net profits of $6,893,000 were reported by Bendix, for the nine months ending Sept. 30, 1929, after subtracting charges and federal taxes, which is equivalent to $3.26 a share on 2,115,000 shares of no par value capital stock.

Alliance Aircraft Put In Hands of Creditors

ALLIANCE (OHIO)—Creditors of the Alliance Aircraft Corporation have taken over the management of the plant, following its shut-down more than a week ago.

Meeting in the factory offices here, creditors chose a temporary committee composed of Walter M. Ellett as chairman, N. M. Scoville as secretary, and Sydney L. Geiger as attorney. The creditors committee consists of G. W. Shem of the Alliance Structural Steel Company of Alliance, Ohio; K. S. Goodin, of the Canton Drop Forging and Manufacturing Company of Canton, Ohio; R. E. McClure of McClure and Wilder of Warren, Ohio; N. M. Scovill of Patton, Chamberlain and Scovill of Cleveland, Ohio; Wm. E. Davis, vice-president of the Alliance First National Bank of Alliance, Ohio; Sydney L. Geiger, attorney, of Alliance, Ohio; and Walter M. Ellett, representing his own firm and the City Savings Bank & Trust Company of Alliance, Ohio.

The present financial crisis, Geiger told the creditors, is due to failure in disposing of a $200,000 stock issue which was authorized several weeks ago but which was not sold because of the New York Stock Market crash.

Assets Approximately $356,807

An audit of the books, Geiger said, shows the company to be solvent, being only handicapped by lack of working capital. Assets total approximately $356,807, of which about $115,000 were development expenses in evolving the engine and plane, while liabilities, consisting of indebtedness to banks and creditors, totaled approximately $126,225. A more complete audit is to be made shortly.

Believing that the present crisis can be weathered, creditors approved plans of taking over the plant. The committee thinks that operations will be resumed in the near future and is to meet in the factory office next week to lay plans for re-opening the plant.

Company officials closed the factory more than a week ago when they learned that stock placed in the hands of a Cleveland broker had not been sold. About 60 men were laid off, while a nucleus of fifteen men, most of them department heads, has been retained to assemble material now on hand.

Farman Factory for Ohio

ST. CLAIRSVILLE (OHIO)—An announcement states that the Farman Aircraft Corporation of France, has purchased deeds for 79 acres of land at Shadyside, near here. It will be the site of a $60,000 factory.

"Fleetster" is Monoplane

A captain in the last issue of AVIATION incorrectly referred to the new Consolidated "Fleetster" as a "sequiplane." The craft is, of course, a monoplane.

BRIEFLY

Reorganization of the western division of T.A.T. was effected as a result of the merger with Maddux Lines. Second pilots have been replaced by mechanics, and there have been several other personnel changes.

National Glider Association has awarded a first class glider pilot's license to W. H. Bowlus, president of Bowlus Sailplane Company, San Diego, Calif.

Offices of Braniff division of Universal Flying Service have been moved from Oklahoma City to Tulsa, Okla. The company keeps only a field hangar and shop at Oklahoma City.

Planes of Thompson Aeronautical Corporation operating in Michigan will be equipped with skiis for winter operations.

Colonal Air Transport is planning to extend its operations along the coast of Maine next summer, and an option has been secured on a seaplane base at Portland.

Kari-Keen Aircraft Company, Sioux City, Iowa, has shipped three carloads of planes to The Western Kari-Keen Aircraft Company, Los Angeles, Calif., during sixty days.

Air Ticket Office has moved from 535 Fifth Avenue to Room 1630, Lefcourt National Building, 521 Fifth Avenue, New York, N. Y.

Governor Harry F. Byrd, of Virginia, recently toured the airports of the state, accompanied by a party of state officials and business men.

Aviation Investor, Inc., New York City, has filed a certificate in the office of the secretary of state changing the corporate name to Investors' Publishing Company, Inc.

Matilde E. Moisant, one of the country's first woman pilots, recently made her first flight in 18 yr. at Oakland (Calif.) Municipal Airport.

One Ryan Brougham has been sold and two orders taken tentatively as a result of the Western Aircraft show, according to the report of Theodore Schlueter, distributor for southern California.

Reports that Ben Eielson's plane was wrecked while he was attempting to fly to the icebound ship Nanuk, near North Cape, Siberia, were erroneous, and he is believed safe, though he has not been heard from since Nov. 9.

Asked as to the present curtailment of activity at Curtiss-Robertson Airplane Manufacturing Corporation plant, Walter Beech, president of Curtiss-Wright Sales Corporation, said that preparations for 1930 production are being made and that full production is scheduled to be resumed within 60 days.

An electric parachute drier has been installed at the army station at Boston airport.

Increase in the demand for leather for upholstery in airplanes is reported by Cleveland Tanning Company, Cleveland, Ohio.

Five Barling NB13 monoplanes have been shipped to the west coast distributor for the Nicholas-Beazley Company at Los Angeles, Calif.

Rum runners are said to be using paved highways near Windsor, Ont., for loading and takeoff of airplanes used in smuggling liquor.

Stoves for pilots' compartment and passenger cabin have been installed and successfully tested on the new Boeing tri-engined transport planes in service between San Francisco and Cheyenne.

Aerial patrol of United States forestry reserves in central and southern California, carried out under contract with T. Claude Ryan, San Diego, was discontinued for the season, Nov. 10.

Aircraft Products Corporation of Canada, Ltd., has been organized as a branch of Aircraft Products Corporation of America, Detroit, Mich.

Establishment of trans-Atlantic air mail service in three years, and passenger service in five to eight years, was predicted by William B. Stout, president of Stout Metal Airplane Company.

Columbia Airways, Inc., and Aeromotive Service, Inc., Salt Lake City, Utah, have consolidated under the name of the former, with capital stock increased from $50,000 to $250,000. Clair O. Brunner is president of the merged organization.

Mohawk Aircraft Corporation, Minneapolis, now offers its Pinto low-wing with the Kinner engine.

New Firms Announced

EAGLE AERO CORPORATION, Baltimore, Md.; capital 10,000 shares of $10 par-value; by Clarence E. Small, Charles Clifford Hall, William B. Calimese; to deal in aircraft.

AVIATION EMPLOYMENT BUREAU, INC., New York, N. Y.; capital $20,000; by F. Darius Benham, Burnett Hershey, Charles A. Rodgers, and others; an aviation employment agency.

AIR SPECIALTIES OF AMERICA, INC., Westbury, N. Y.; capital 300 shares of no par value; by Marchelin Lombardi, Barnett Mackler, George Berkman.

COLUMBUS AIRWAYS, INC., Columbus, Ind.; by C. H. Clevenger and Fay W. Pumphrey.

HERTZ DRIVURSELF STATIONS OF FLORIDA, INC., Miami, Fla.; capital 5,000 shares of no par value stock and 2,000 shares preferred stock, par value $100; by C. L. Locke, V. Edelman, E. Cruse; to rent airplanes, automobiles, trucks, etc.

MINNESOTA FLYING SERVICE, Hibbing, Minn.; capital $50,000; by Theron Fuller, C. A. Helm, E. L. Keen, R. H. Grafing, R. F. Davis.

106TH FIELD ARTILLERY AVIATION CLUB, INC., Buffalo, N. Y.; capital 200 shares of no par-value stock; by John Goetz, Taersa DeRosia, Clarence Nichols.

N. Y. Air Commission Conducts Law Survey

ALBANY (N. Y.)—The New York State Aviation Commission, of which Sen. J. Griswold Webb, of Dutchess County, is chairman, is making an exhaustive study and research into every phase of aeronautical activities with the idea of recommending to the legislature of 1930, the addition of such laws as will give this state its rightful place in the encouragement and protection of air transportation.

The report of the Commission, which will be submitted to the Legislature about Feb. 1, will review the progress made by aviation in this state and nation and will quote from the experience of other states as to the best means of handling the problems peculiar to flying.

Included in the data, will be the results of a survey which has been made of high tension electric wires in the state and their location. The Commission has had maps prepared, showing just where these occur in relation to airports and will have them reduced in size and published as a part of the report.

Later, they may be printed in pamphlet form and be made available to aviators and others who might be aided by the information.

Schools and Colleges

SOUTHERN COLORADO AIR TRANSPORT COMPANY will open an aviation school at Pueblo, Colo., Dec. 1.

AKRON UNIVERSITY, Akron, Ohio, will offer evening ground school courses beginning Dec. 2.

RANKIN SYSTEM is planning to establish a school in London, Ohio.

RAPID AVIATION, INC., has started a ground school at Omaha, Neb., with sixteen students enrolled.

CURTISS-REID FLYING SERVICES, LTD., Montreal, Que., is offering special rates to members of McGill University Light Aeroplane Club.

LEAVENWORTH TECHNICAL HIGH SCHOOL, Waterbury, Conn., has formed a class in airplane design, and students plan to build a Northrop glider.

DARTMOUTH UNIVERSITY students at Hanover, N H., have formed a flying club of which J. C. Holme, Jr., formerly on the staff of AVIATION, is president, and plans for purchase of a plane are being formulated.

MCMULLEN FLYING SCHOOL instructors will give a ground school course at the University of Florida, Tampa, Fla.

UNIVERSITY OF TENNESSEE, Knoxville, Tenn., will inaugurate a ground school course in the College of Engineering, some time in December.

BOEING SCHOOL OF AERONAUTICS, Oakland, Calif., has inaugurated special courses for business men, leading to private or limited commercial licenses.

PERSONNEL

RALPH G. LOCKWOOD has been appointed chief of operations for Colonial Airways system to succeed DUDLEY E. ROWLAND. OLIVER A. GOTTSCHALK will be his assistant.

GLENN P. SMITH, recently assistant treasurer of Interstate Airlines, has been promoted to a position with The Aviation Corporation, holding corporation for the first company.

GEORGE BRALLA has been made production manager of American Aeronautical Corporation's factory, Whitestone, L. I., N. Y.

E. A. WATKINS, president of Watkins Aircraft Company, Wichita, Kan., and head of central division, Universal Air Lines, has been named chairman of the aeronautical committee of National Standard Parts Association, Detroit, Mich.

ROBERT ORTHWEIN, local passenger agent for T.A.T. at Wichita, Kan., has been transferred to St. Louis. He is succeeded by C. E. MCCOLLUM.

LIEUT. LEIGH WADE, vice-president and chief test pilot of Consolidated Aircraft Company, has gone to South America to direct sales of Fleet and Husky planes.

FRED E. WEICK, research engineer for Hamilton Standard Propeller Corporation, Milwaukee, Wis., has been transferred to the Los Angeles branch of the company, where he will continue his research work.

ROBERT BAUMAN has been made factory sales representative for Detroit Aircraft Corporation, to cover southwestern United States.

ROBERT J. NEBESAR, formerly with the General Airplanes Corporation, has been appointed project engineer with Detroit Aircraft Corporation, Detroit, Michigan.

JOSEPH W. SABIN is the new general traffic manager of Universal Aviation Corporation, suceeding ROY A. BISHOP, resigned.

S. D. WELSH, superintendent of the western division of T.A.T., has resigned to accept a position with Boeing System.

DON FLINT has been appointed sales manager of Sidles Airways Corporation, Lincoln, Neb.

LELAND S. JAMIESON, director of schools for Interstate Airlines, Inc., has been promoted to the position of operations manager.

A. S. KOCH has been named vice-president and general manager of Mohawk Aircraft Corporation, succeeding G. P. MURPHY, resigned.

J. F. COX is now in charge of materials for Spartan Aircraft Company, Tulsa, Okla.

ALBERT E. HASTINGS has been appointed sales manager of Bowlus Sailplane Company, San Diego, Calif.

A. F. WHITE, recently sales manager of International Aircraft, is now eastern sales director for Gruss Air Spring Company.

JACK RHYNSBURGER has resigned as field supervisor of Arrow Airport, Inc., Havelock, Neb., to accept a position with Stearman Airplane Manufacturing Company, Wichita, Kan.

ROBERT H. GAMBLE, DR. RALPH N. GREENE and H. H. RODENBAUGH, all of Jacksonville, Fla., have been appointed to the advisory board of Pitcairn Aviation, Inc.

LELAND S. JAMIESON has been promoted to the position of operations manager of Interstate Airlines flying schools, with headquarters at Evansville, Ind.

MASTER SERGEANT JAMES TATE has been appointed parachute instructor for Von Hoffman Flying School, St. Louis, Mo. JOHN J. HUEN has been made office manager.

WINSTON HEALY has been appointed traveling passenger agent for Stout Air Services, Inc., Detroit, Mich. BERNARD B. GRAGG, JR., has been made assistant traffic manager of the Cleveland division.

Representatives Named

BENDIX—Air Associates, Inc., New York City, distribution and service for New York and Chicago territories.

KARI-KEEN—Lincoln Flying School, Lincoln, Neb., for the state of Nebraska; Davy Aircraft Company, Flint, Mich., for the state of Michigan.

LOCKHEED-VEGA—Yarbrough Motor Company, Atlanta, Ga., for the state of Georgia.

AERONAUTICAL CALENDAR

Dec. 9-14	Baltimore-Washington Aircraft Show, Baltimore, Md.
Dec. 10-16	National Aviation Week, Mexico, including air show and air display at Mexico City.
Dec. 16	Regional Airport Conference for New England, Bridgeport, Conn.
Jan. 13, 1930	S.A.E. Aeronautic Meeting, Miami,
Jan. 21	S.A.E. Annual Meeting, Detroit, Mich.
Feb. 5-12	New York Aviation Show, auspices Aviators' Post, American Legion.
Feb. 8-15	Cincinnati, Ohio, Aircraft Show.
Feb. 15-23	International Aircraft Exposition, St. Louis, Mo.
Mar. 6-15	Second Annual Pittsburgh Aircraft Show. Motor Square Garden, Brown Boulevard, Pittsburgh, Pa. Office is Aero Club, Pittsburgh, William Penn Hotel.
April 5-13	All-American Aircraft Show, Detroit.
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City.

AIR MEETS

Jan. 13-15	All-American Air Meet, Miama, Fla.
Dec. 15	Los Angeles Metropolitan Airport

AIRPORT DEDICATIONS

Dec. 4-5	Roswell, N. M., Airport.

A.S.M.E. Considers Stocks, Gliding, Airports

NEW YORK (N. Y.)—Speakers at the Aeronautic Division meeting of the American Society of Mechanical Engineers which was held here Nov. 21, were Ormand Milton, manager of the Aero Engineering & Advisory Service, Inc.; Charles J. Ernst, of Black & Bigelow, Inc.; and Prof. Alexander Klemin, director of the Daniel Guggenheim School of Aeronautics, New York University.

Mr. Milton treated the investment aspects of aviation and gave many reasons he believed responsible for the low state into which air securities had fallen. They were: 1—initial overvaluation, 2—overproduction (or as one person put it, under-consumption), 3—threatened reductions in United States air mail contracts, 4—experience, 5—deferred achievement of the utlimate in safety and the minimum in operating costs, both of which have a direct bearing on sales, and 6—the general market crash.

He advised all persons to investigate the earnings and cash position of a company, and the many factors influencing its earnings, before investing in the firm's securities. Mr. Milton cited examples of what he meant by reading reports of several large aeronautical corporations.

Field Planning Discussed

Airport planning was the subject taken by Mr. Ernst, who said the following things should be taken into consideration when planning one: 1—resultant area available, 2—adaption to ground traffic demands, 3—the specific purpose or use of the port contemplated, and 4—possibilities for expansion. In speaking of suitable material for hangars, he listed as satisfactory, ones of steel, wood, and masonry; wood and masonry; or all-wood.

During the course of his lecture, Mr. Bigelow illustrated it with diagrams and showed pictures of the proposed Armstrong Seadromes. He explained in detail, the use and operation of these sea bases.

Professor Klemin gave a talk on gliders, describing slides of that type of craft belonging to Raymond E. Dowd, which were thrown on the screen.

Test Edo-Pontooned Travel Air

COLLEGE POINT (L. I.)—Department of Commerce tests were recently carried out on a Travel Air Model SE4000, a Wright J-6 powered biplane, equipped with Edo Model 2665 floats. The tests were made at the Edo seaplane service base here, under supervision of Raymond B. Quick of the Commerce Department, and George B. Post, who represented the Travel Air Manufacturing Company and the Edo Aircraft Corporation. Officials announced that this was the seventeenth Edo float installation to receive approval and the fourth type of Travel Air to be equipped with Edo pontoons.

AIRPORTS AND AIRLINES

Aero Branch Urged To Start Port Rating

WASHINGTON (D. C.)—The Aeronautics Branch is being urged by those interested in aviation both inside and outside of the government to make an immediate rating of airports even though such a rating may have to be tentative because of the incomplete information now available. It is contended that the main purpose of the airport rating work which the department has been authorized to do is to afford a service to the aviation industry. Because of this, it is believed that primary consideration should be given to making available information as to the relative merits of the various airports as soon as possible.

It would be far better for pilots to be supplied with information rating the airports according to their present condition, it is pointed out, than to withhold all announcements under the rating provisions pending the completion of improvement programs. Officials of the Department explain that the apparent slowness of the work is due to the desire on the part of local airport organizations to obtain the highest possible rating. When those responsible for airport development are acquainted with the conditions they must meet to obtain the preferred rating, they usually ask the Department to postpone its examination of the facilities until improvements can be made.

Compulsory Rating Suggested

Thus the Department, although in receipt of many tentative requests for ratings, has not yet been able to make any assignments of grades. Another part of the grading program that needs improvement, it is pointed out, is in connection with the machinery for putting the assignment of grades into effect. As the work is being done at present, no airport can be rated except at its own request. It is believed that the work will be much more valuable to those flying the airlines if the government's airport engineers are empowered to grade the various fields and ports whether they ask for it or not.

This would open up the question of just how far the government's jurisdiction extends over the local airports. It is generally conceded that the federal authorities have a rather limited power as far as the local airports are concerned. It is pointed out, however, that this power may be exercised indirectly so as to accomplish the purpose desired. The Federal government can exercise some degree of control over the fields that are used by interstate aircraft, it is contended, and by this means can make some kind of a rating of all airports except those that are restricted to local air traffic.

Company to Own United's Ports

NEW YORK (N. Y.)—A new unit has been added to the group of companies controlled by United Aircraft & Transport Company. This is United Airports, Inc., a concern organized with Delaware charter to own and operate airports throughout the country. At present the new company owns the United Airport at Burbank, Calif., and the new Pratt & Whitney field at Hartford, Conn. Definite plans about additions have not been announced. This is the thirteenth subsidiary of the parent company. It is authorized to issue 2,500,000 shares of stock.

P.A.A. to Extend Passenger Services

NEW YORK (N. Y.)—Pan American has announced plans to increase the frequency of trips on certain of its routes and add passenger service to lines formerly carrying mail exclusively. They are as follows:

Beginning Jan. 1, the Miami-San Juan line is to be operated daily instead of tri-weekly as at present. Passenger rates are to be cut about 25 per cent. The Miami-Cristobal line, hitherto operated for mail and express only, will be opened for passenger service on a tri-weekly basis Dec. 21. Beginning Jan. 1, passengers will be allowed to travel on the weekly plane operated over the Cristobal-Buenos Aires line. Passenger service is to be inaugurated between Guatemala City and Managua. Beginning Jan. 1, also, seven planes will be operated daily over the Miami-Havana line and the daily service between Miami and Nassau will be opened for the season. Beginning Dec. 21, the company will open the San Juan-Paramaribo and Cristobal-Curacao lines for passengers. These are both weekly services. These changes represent a new policy for Pan American Airways.

Notruss Hangar Strength Tested

CLEVELAND (OHIO)—Tests simulating high wind pressures and heavy snow loads were made recently on a Notruss hangar, a trussless all-wood structure, belonging to the Great Lakes Aircraft Company. Wind conditions were secured by attaching three cables to the building, ranging in location from near the ground to near the apex. After applying a theoretical pressure of a 90-mi. wind, it was found that there was maximum deflection of $\frac{3}{4}$ in. and an average deflection of $\frac{1}{4}$ in. in the arch. Then 19,500 lb. of sand were piled on either side of the hangar crown, simulating a snow pressure of 30 lb. per square foot, and after their removal maximum deflection of only $\frac{5}{8}$ in. was found.

Demonstrate New Sprinkler For Hangars

NEWARK (N. J.)—Tests to demonstrate the effectiveness of a new "deluge" sprinkler system in controlling hangar fires were carried out Nov. 20 in the Colonial hangar at the Municipal Airport under the auspices of the City of Newark, and "Automatic" Sprinkler Corporation of America, Youngstown, Ohio, makers of the apparatus. Preliminary tests were arranged to provide a comparison between the new system and the more common "wet pipe" system actuated by fusible plugs. The deluge system is actuated by expansion of heated air from hollow metal balls through capillary tubes, and is thus affected only by rate of rise of temperature, rather than specific temperature of fusion. The pipes are dry when the sprinkler is not in use.

In the first test, the deluge system was set off in 21 sec. after the lighting of 10 lb. of excelsior on the floor, and water was delivered on the fire in 25 sec. The burning of 10 lb. and then 40 lb. of excelsior failed to actuate the wet pipe system with fusable plugs which was also installed. One plug was fused and water delivered to the fire 1 min. 3 sec. after the lighting of 80 lb. of excelsior, and a second plug fused after 2 min. 15 sec., but neither plug was directly over the fire. Further comparative tests tended to substantiate the claims of greater speed and effectiveness for the deluge system in the case of creeping fires and explosions, simulated by a whirling spray of burning gasoline.

The final test consisted of a fire of plane materials saturated with gasoline, and a plane fuselage which contained an open can holding 3 gal. of gasoline. Water was delivered to the fire 38 sec. after it was lighted, and the system was operating in every bay in the hangar 2 min. 20 sec. later. Floor plugs providing a spray from below were also operated. They were a feature not previously found in hangar sprinkler systems, and greatly increased the effective coverage. The water would not, of course, quench the burning gasoline, but effectively kept the flames from spreading. An old plane which had also been soaked in gasoline and placed adjacent to the burning material was not ignited, and, in fact, the top surface of a wing directly over the burning gasoline in the cockpit did not catch fire, though the under surface was destroyed.

T.A.C. to Install Skiis

CLEVELAND (OHIO)—All air mail and passenger planes of the Thompson Aeronautical Corporation will be equipped with skiis this winter, R. C. "Tex" Marshall, vice-president and general manager, announced.

Aero Branch Reports Air Transport Status

WASHINGTON (D. C.)—An interesting analysis of the air transport situation in this country has been made by the Aeronautics Branch based on the reports from 27 of the 40 operators in the country. These reports cover the first six months of this year and the analysis has projected the theoretical set of figures for all the companies for that six month period and for the entire year. Scheduled operations and miscellaneous flying such as taxi, sight-seeing, etc., are included in the analysis, it is reported.

It is estimated that about 3,527,003 persons will have ridden in aircraft during this year. About 45,000 passengers were carried on regular scheduled services during the first six months, an average of 254 passengers per day. Miscellaneous operators carried about 748,000 passengers during April, May and June, an average of about 8,311 per day. About 47,000,000 mi. were flown by these miscellaneous operators during the first six months. There are now about 90,090 mi. of flying scheduled daily over established airways, the report said, of which 51,801 mi. are with mail.

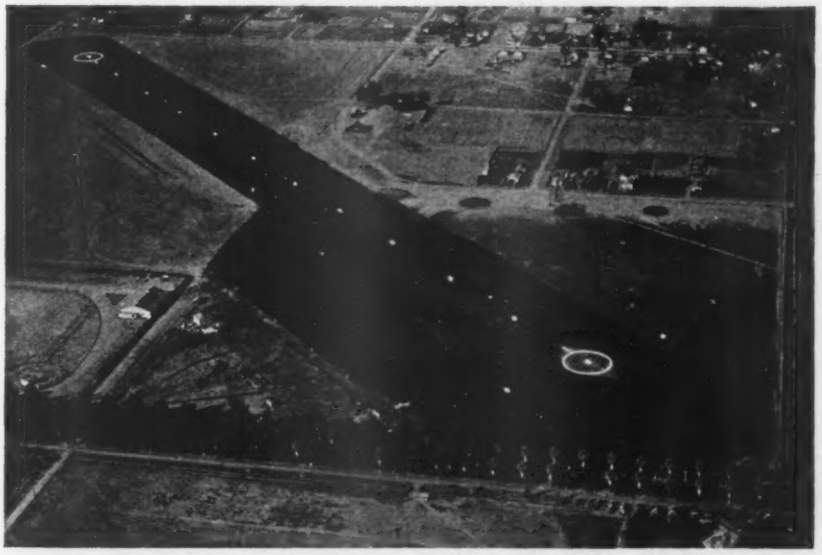
Lehigh Port Contest Draws 250

NEW YORK (N. Y.)—More than 250 entries for the Lehigh Airports Competition had been received up to the time of closing of the contest Nov. 18. As this is being written the judges are going over the designs, a large number of which are said to be of unusual quality, and it is expected that definite announcements about the winners will be made about Dec. 1. This contest, it will be recalled, was launched by the Lehigh Portland Cement Company to stimulate thought in this country along the lines of adequate air transport facilities for the future. Prizes totalling $10,000 have been offered and the competition was launched in the early spring.

Pickwick Extends Line

LOS ANGELES (CALIF.)—Inauguration of daily round trip service between Guatemala City and San Salvador has been announced here by Thomas E. Morgan, general manager of Pickwick Latin-American Airways. This extension adds 112 to Pickwick's 2,400-mi. airline linking Los Angeles with Mexico City and Guatemala City with a daily passenger, mail and express run.

Fresno, Calif., Opens New Airport



CHANDLER FIELD, the new municipal airport of Fresno, Calif., was dedicated recently. The field consists of about 100 acres situated 1.3 mi. west of the main section of the city. The effective main runway into the prevailing winds, which are either from the northwest or southeast, is 3,000 ft. long and 400 ft. wide.

The runways are lighted by amber lights placed flush with the ground and mounted in 4 ft. concrete circles at 245 ft. intervals along the center of the runway. On each end of the runway are three green approach lights, which mark the end of the effective runway, and are installed in the same manner as the amber lights. Night landings are made between the green lights and on or along the line of amber lights placed along the runway.

Three banks of floodlights have been installed at different locations on the field, so that pilots may land without the light in their eyes. The 3,000,000-cp. beacon is on a 57 ft. tower and contains a mechanism which flashes the letter F for Fresno in international code. Construction of a building to house administration offices and to be the 24-hour-a-day home of the port superintendent has been started and present plans include the construction of other buildings in the near future.

Report 1,509 Airports Now in United States

WASHINGTON (D. C.)—The latest reports on the country's airports made by the Aeronautics Branch states that 1,509 now are recognized and classified as follows: Municipal, 440; commercial, 465; intermediate, 278; government, 86; auxiliary, 240. These airports are those marked and/or having more or less facilities. It is said there are about 4,000 other fields on which landings may be made. About 1,278 airports have been proposed or are in process of construction.

The distribution of the 1,509 recognized airports by states is as follows: Alabama, 16; Arizona, 36; Arkansas, 15; California, 161; Colorado, 24; Connecticut, 11; Delaware, 5; District of Columbia, 5; Florida, 41; Georgia, 27; Idaho, 12; Illinois, 67; Indiana, 43; Iowa, 42; Kansas, 42; Kentucky, 9; Louisiana, 15; Maine, 5; Maryland, 15; Massachusetts, 24; Michigan, 45; Minnesota, 20; Mississippi, 8; Missouri, 31; Montana, 22; Nebraska, 30; Nevada, 29; New Hampshire, 6; New Jersey, 30; New Mexico, 26; New York, 57; North Carolina, 26; North Dakota, 9; Ohio, 72; Oklahoma, 48; Oregon, 28; Pennsylvania, 83; Rhode Island, 10; South Carolina, 18; South Dakota, 18; Tennessee, 8; Texas, 101; Utah, 26; Vermont, 9; Virginia, 31; Washington, 30; West Virginia, 9; Wisconsin, 40; Wyoming, 24.

Cromwell Airlines Starts

SAN ANGELO (TEX.) — Twice daily round trip passenger service between San Angelo, Fort Worth and Dallas was inaugurated Nov. 1 by the recently organized Cromwell Airlines, Inc. The line is designed primarily for the convenience of West Texas oil operators. Stinson Wasps are being used. Carl Cromwell, San Angelo oil operator, is president and general manager of Cromwell Airlines. He has used a Lockheed plane in his private business for the past year. D. D. Myers is traffic manager with headquarters in Fort Worth.

Montgomery Plans Third Line

MOBILE (ALA.)—A passenger line between Mobile and Pensacola, Fla., will be started by the Montgomery School of Aeronautics, by Jan. 1, according to R. M. Ressler, representative of the company. The company has been operating a line between Jackson, Miss., and Montgomery and another from Montgomery to Atlanta for some time.

C.A.T. May Cut Fares

BOSTON (MASS.) — Colonial Air Transport is considering the matter of decreasing fares between Boston and New York, and a questionnaire has been sent out to business men asking if they would consider using the air service if the fare were only slightly over the special train fares.

AIRPORT CONSTRUCTION PROJECTS

East

THE MUNICIPAL building at the Boston Airport is nearly completed, and will be ready for dedication early in December. Albert L. Edson, airport manager, will be the first to move in. His offices are on the second floor. The Weather Bureau and State Aviation Supervisor Robert L. O'Brien will be on the same floor. On the first floor will be offices for the Postal Telegraph and Western Union and a large room for the Post Office Department for air mail sorting. Customs, immigration, hospital, garage, lunch room, news counter, consolidated ticket offices, a room for visiting pilots and public rooms have also been provided. A wind indicator of metal has been placed on the roof.

A 35x35 ft. concrete swimming pool is to be constructed at the Del-Mar-Va at Nepa, Md. The contract has been awarded.

Construction of the New Haven (Conn.) Airport is under way. The site chosen includes 179 acres located in what used to be known as Morris Cove section, with a shore front also available. Trees will have to be cleared, swamp filled in by dredging the harbor, and a creek bed will have to be shifted 500 yd. It is planned to so shift this creek as to provide water-ways around the field. The creek now crosses it. Two runways are planned, each 500x 2,800 ft.

A hangar, workshop and lecture room are under construction at the Hamden, Conn., airport. The field was opened recently.

Work on the 63-acre tract adjoining the Utica (N. Y.) Municipal Airport, has been delayed by inclement weather. About half of this addition to the airport has been completed and the remainder will be put in shape early next spring.

Whittelsey Manufacturing Company, Bridgeport, Conn., is negotiating for property near its plant for use as a testing field for the Avian planes. Residents in the vicinity have started a legal battle under the zoning law to prevent such use of the property.

South

Austin, Tex., will erect an administration building and hangar at the municipal airport, as well as machine shop, runways, etc., and will then lease the airport to Southern Air Transport Company.

The Clarksville (Tenn.) Aviation Corporation have completed their 265-acre airport and it will be under the management of Capt. John F. Outlaw.

Graybar Electric Company has the contract for lighting equipment for Sky Harbor Airport at Murfreesboro, Tenn., owned and operated by Interstate Airlines, Inc., Evansville, Ind.

Plans have just been announced for the construction of what will be called Callaway Field at La Grange, Ga., on the Atlanta-New Orleans Airway. The tract includes 40 acres. Between 600 and 800 trees have been cut down and a crew of 160 men with tractors, plows and scrapers have leveled a hill and filled in a swampy area. Hangars, workshops, lighting and other facilities are to be installed.

Pocahontas Transport Company, located at the Asheville-Hendersonville Airport, N. C., has contracted for the administration building and for the doubling of the size of the present steel and brick hangar. It was hoped that the work on the field would be entirely completed for a formal opening Dec. 1.

Central

The 160-acre tract which has been dedicated by the park board of Joliet, Ill., for a municipal airport development will be improved immediately to provide landing strips for planes during the winter. In the spring final work will be started to bring the port to Aeronautics Branch specifications. For the present two landing strips will be laid out diagonally across the field, beacon light tower and equipment are on the way already and gas lights will be provided to illuminate the field this winter. Construction of hangars, permanent improvement of the runways and other work incident to the completion of the port will be undertaken in the spring.

Wichita may have to lop off a few wings of the administration building planned for the municipal airport or pay more money than was intended, it was indicated by a study of recently completed architectural plans. Working on specifications laid down by the city commission, the architect designed a two-story structure of rambling Spanish type to house offices, rooms for pilots, field control and weather observation room, dining room, serving room, ball room, soda fountain, barber shop and other concessions contributing to the comfort of those staying overnight.

A range beacon and a marker beacon, units in the government radio system, are to be installed at Fort Crook, Omaha, soon at a cost of $20,000. Marker beacons will also be installed at York, Neb., North Platte, Neb., Sidney, Neb.; and Cheyenne, Wyo., at about the same time.

Actual improvements about the Grinnell (Ia.) Airport were started recently when Joel Stewart let a contract for a hangar, 28x34 ft., adjacent to the landing field site.

An automatic low pressure steam heating system is now being installed in two of the hangars of the Von Hoffmann Aircraft Company, St. Louis, under the direction of B. Russell Shaw Co., Inc., airport engineers. The installation is a recirculating low pressure system, claimed to insure adequate temperatures anywhere in the building at 10 deg. below zero. The system includes a series of unit heaters, each controlled by a mercury thermostat connected individually with the oil burner.

A radio receiving set has been installed at the Akron Municipal Airport for the purpose of picking up weather reports. Formerly, such reports were obtained from Cleveland by telephone, but this method was not entirely satisfactory.

Western Air Express has announced plans to build a $75,000 hangar at the Kansas City Municipal Airport. The building will measure 140 x 119 ft., providing 17,255 sq.ft. of floor space. The doors will be 109 ft wide.

Richards Field, the first airport at Kansas City, is being improved by the erection of new buildings, and installation of aprons.

The city of Springfield, Mo., has let the contract for construction of a $25,-000 administration building at the municipal airport.

Boundary lights at the Grosse Ile Airport, Detroit, have been completed.

West

Giving Portland, Ore., its third private flying field, Gardner Flying service has opened the Gardner airport about 12 miles east of the city on one of the main traveled roads. The field includes about 50 acres which the operator, Edward Gardner, has under five-year lease with option to purchase. Two runways, 1,500 feet north-south, and 2,000 feet east-west, have been marked out. Six one-plane 42x32 frame hangars are being built.

An illuminated circle measuring 100 ft. in diameter has been installed at the Salt Lake City Airport. The device includes a concrete circle flushed with the ground and in which 31 60-Watt lamps have been placed.

The Austin Company of California is making a survey for the General Aviation Corporation, Ltd., at the Mission Airport, San Gabriel, Calif., preliminary to a $1,000,000 development there.

The Austin Company also is to build a two story passenger depot 65 x 90 ft. and a one-story hangar 155 x 200 ft. at Cheyenne, Wyo., for Boeing. The two buildings will cost a total of about $200,000.

Waale & Shattuck Construction Company, who have contract for building new administration building and hangars at Portland, Ore, have issued sub-contracts to various contractors. The entire project will cost $130,000.

Bullard & Millam were successful bidders for the construction of a hangar at the Willapa Valley Airport, Raymond, Wash.

Arrow Aircraft & Motors Corporation, Lincoln, Neb., is having plans prepared for a hangar to be built one mile northeast of the city.

Stout Adds Local Stops to Service

DETROIT (MICH.)—Stout Air Services, Inc., operators of Detroit-Chicago and Detroit-Cleveland passenger lines, inaugurated a "local" on the Detroit-Chicago division Nov. 1, it was announced here by Stanley E. Knauss, vice-president and general manager. The local is the morning plane of the two-a-day service, and will stop at Battle Creek, Kalamazoo, and South Bend. Two additional local stops over this 255-mi. run will be made, it was announced, as soon as the airports at Jackson and Ann Arbor are in shape to take care of the service.

Stout Air Services was organized in 1926 and, to date, has carried more than 97,000 passengers a total distance of more than three-quarters of a million miles, without an injury to a passenger. The Stout lines operate daily, except Sunday. The westbound local leaves Ford Airport at 10:15 a.m. eastern time, arrives at Battle Creek at 10:20 a.m. central time; Kalamazoo, 10:40 a.m.; South Bend, 11:20 a.m. and Chicago 12:25 p.m. The eastbound local leaves Chicago Municipal Airport at 9:15 a.m., central time, arrives at South Bend at 10:15 a.m.; Kalamazoo, 10:55 a.m.; Battle Creek, 11:15 a.m.; and Detroit, 1:20 p.m. eastern time.

Fare on the new line is $38 for the complete trip.

Negotiations are under way between Stout and Clifford Ball, Inc., for the inauguration of through service from Washington to Chicago with a connection at Cleveland.

Revise St. Louis-Omaha Service

OMAHA (NEB.)—Universal Air Lines has discontinued passenger service on the Omaha-Kansas City-St. Louis line, and the Fokkers used on the route will be substituted by lighter Pitcairn planes in which nothing but air mail will be carried. Traffic offices of the company were discontinued at Omaha Nov. 16. The line was opened May 1.

Stout Serves Meals to Travelers

CLEVELAND (OHIO)—All passengers on the Stout Air Lines flying from Cleveland to Battle Creek, Kalamazoo, South Bend or Chicago, now are being served a luncheon during the 30-min. stop-over at Ford Airport in Detroit. Immediately upon deplaning the through passengers are taken to a Dearborn restaurant where they are guests of the Stout line. The company car returns them to the airport just in time to catch the Chicago plane 30 min. later.

Seek to Increase Air Map Production

WASHINGTON (D. C.) — Constantly growing demand for air maps from the Coast and Geodetic Survey has caused that department to seek means for more rapid progress in their preparation. So far this preparation has been rather slow because of the great amount of work involved in each map. For instance, the department published its first strip map in June, 1927. Nine more have been issued since then and six more should be ready by the first of next year. Seven more are in a less advanced stage of progress and 27 have been projected.

Beside the strip maps, sectional maps are being made. These have been found necessary because of the increasing volume of flying being done away from established airways. Both are constructed on a scale of about 8 mi. to the inch, the strip map covering an area 80 mi. wide along the airway and the sectional map an area 3 deg. north and south and 4 deg. east and west. Everything has been simplified and standardized to make possible quick identification of terrain from the air. To assist in the determination of correct altitude the elevation of the terrain above sea level is indicated by shadings of green and brown—green representing elevation of the terrain from sea level to 1,000 ft., light brown for 3,000-4,000 ft., and progressively darker brown as elevation is shown to increase on the map.

Boeing's Weather Trucks Begin Work

OMAHA (NEB.)—An expedition consisting of two auto trucks, each a traveling weather bureau and radio station manned by a crew of two operators, left the Boeing offices here recently, one to spend the winter in the area about Alliance, Neb., and the other in the foothills of Casper, Wyo.

They were outfitted by Boeing to cooperate with and supplement the government airways weather service. Their particular purpose is to check up on storms which, originating in the Northwest, are sometimes lost for a number of hours. When the most favorable sites for location of weather stations are determined, these will be replaced by permanent and stationary structures.

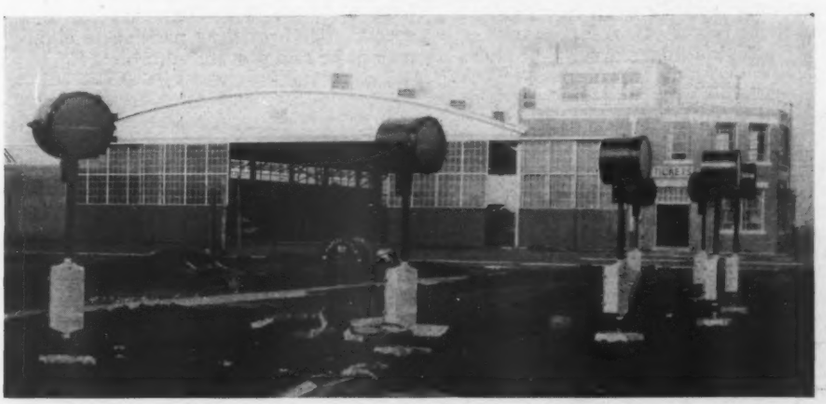
O. T. Larson, formerly of the weather station in Chicago, and D. C. Cameron, formerly of the Kansas City station, are in charge of the meteorological work but they, like William Lorenz, directing communications, will be located at Cheyenne where the data will be tabulated while H. L. Newman and A. H. Anderson will operate the Alliance truck, and Joe Gurr and A. Forni will man the one at Casper.

The operators expect to be isolated for weeks at a time. In addition to regular food supplies, they are carrying emergency rations of concentrated foods. In case they are marooned for a longer period than they expect, supplies will be dropped to them by plane. They are prepared for 40 below zero weather and are taking sleeping bags and tents. Gasoline stoves will be used to heat the trucks, which are insulated against cold.

They will rely on books, their work, and the two radio sets each will carry, one for voice and one for spark transmission, to make the winter pass swiftly. Weather reports will be made over the full 24-hr. day.

Included in their equipment are: four 12-volt batteries and a Delco charger; a ceiling light; four gasoline tanks holding about 100 gal.; hydrogen tank for balloon inflation; three 36 ft. radio masts, and anenometer and wind sock.

New Facilities at Montgomery (Ala.) Airport



SHOWING THE NEW hangar and administration building and battery of floodlights at the Montgomery Airport. The building includes a comfortable reception room.

Airport Dedications

Among the airports dedicated recently was the Menefee Airport at New Orleans. This tract has been improved by an extensive draining process which has required five months under the direction of John Blain, airport engineer for Southern Air Transport, which leases the field. A Diesel engine has been installed to pump water from the field continuously at the rate of about 500,000 gal. per day. Runways 2,500 ft. long have been built, two drainage ditches have been installed and a levee has been raised entirely around the tract. An administration building and large shop have been completed.

The Clarkesville (Tenn.) Airport was dedicated Oct. 28; the Wanaque (N. J.) Airport on Nov. 2, and the Perry (N. Y.) Airport on Nov. 9.

FOREIGN ACTIVITIES

Switzerland to Spend $4,000,000 on Air Force

BERNE (SWITZERLAND) — Switzerland's military aviation corps is to be reorganized and almost entirely equipped with new planes. The new project which has been submitted by the Military Department to the Federal Council for approval calls for an appropriation of $4,000,000 (20,000,000 Swiss francs). One half of this sum is to be used for the purchase of 105 military machines—60 pursuit planes and 45 observation planes. Equipped with Hispano engines, these planes are to be of the latest types, and will probably be built in Switzerland, under license, according to models imported from abroad. The greater part of material to be used in their construction will be of Swiss origin. The remaining $2,000,000 will be used for the purchase of material and supplies necessary for technical improvements and reorganization.

In 1927, Switzerland's military air fleet consisted of 84 observation planes and 54 pursuit planes. In addition, 40 planes were used by the photographic and service divisions. Few changes have taken place since then, in anticipation of the new project for complete reorganization which has been in preparation and is now shortly to be adopted.

Dewoitine Popular

The Swiss government airplane plant in Thun manufactures Dewoitine military planes under the supervision of their French inventor. The two latest Dewoitine models first tested in June, 1928, have met with considerable approval. The D. 19 is equipped with a 400 hp. Hispano engine, weighs with pilot and outfit 3,064 lb. has a maximum speed of 166 mi. per hour, and can climb to 16,400 ft. in 12 min. The D. 27 is smaller, weighs with pilot 2,690 lb., and with a 400 hp. Hispano engine developed a speed of 177 mi. per hour when first tested. Both these types are made of duralumin. Six of the Dewoitine planes were recently sold to the Argentine government.

In addition Alfred Comte, a Swiss inventor, manufactures a pursuit plane, the A C 1, which is built somewhat on the lines of the older D. 9 type. Equipped with a 600 hp. Jupiter engine, the A C 1 attains a speed of 161 mi. per hour; it is also built of duralumin. Several of these have been shipped to the Jugoslav government. It is hard to say which makes will be favored by the Swiss government. Public as well as expert opinion has long been in favor of the latest Dewoitine models, but recently there has been some talk of the French Potez and the Dutch Fokker.

Restrict Croydon Activities

LONDON (ENGLAND)—In view of the rapidly increasing airline and air taxi business at London's terminal airport, Croydon, and in order to prevent overcrowding, with its attendant delays and risks, the British Air Ministry has decided to restrict school and joy-ride flying there. Before long it is probable that the airport will be used exclusively for regular and taxi flights.

Lascoter Australian Monoplane Described

SYDNEY (AUSTRALIA)—Further details of the Lascoter semi-cantilever high wing monoplane built in this country by the Larkin Aircraft company have been obtained. This is a cabin machine designed to carry five persons, including pilot, with a normal range of about 600 mi. Attention has been given to robust construction to make it suitable for operation in Australia.

The fuselage is of patented steel tubular construction without welded joints. It is built in three sections: front end, cabin and rear end. The front and rear ends are quickly detachable. The wing is of simple wood construction with two main spars of the box type, with spruce top and bottom members and plywood sides. The ribs have spruce cap strips with plywood sides, a type considered particularly strong. This is demonstrated by test loading exceeding 600 lb. per rib.

The wings are detachable from the fuselage, the attachment being made by a steel spindle. They are externally braced by two tubular steel streamline struts. It is built for any of the following three power plants: 250 hp. Armstrong Sidelley Puma; the 335 hp. Nimbus; and 425-hp. ungeared Jaguar. The gasoline is fed by gravity from a tank built in the center section. The main tank holds between 50 and 80 gal., and there is a 5-gal. reserve tank.

A split-axle undercarriage provides a wide track of 13 ft. The wheels are mounted on sloping axles, and are equipped with independent wheel brakes, operating in conjunction with the rudder. The shock absorbing system is of the Oleo-pneumatic type without any rubber installation, and is designed to withstand landing shocks corresponding with 14 ft. per second vertical velocity. Mountings are provided for rapid attachment of floats in case it is desired to convert the machine into a seaplane.

The windows of the cabin are fitted with unsplinterable glass. Semi-pneumatic upholstery is provided on the comfortable leather lounge chairs. Special precautions have been taken to eliminate engine fumes by means of a ventilator adjustment. The cabin walls have a double skin interspaced with a special sound-resisting packing to eliminate noise and prevent vibration.

Mail Being Carried To French Indo-China

PARIS (FRANCE)—By special arrangement between the French, Dutch and English Air Ministries, six commercial flights from Amsterdam to Saigon, Indo-China, and return were scheduled during October, November and December. Mail has been carried from Amsterdam to Bangkok, Siam, by K.L.M., and from there to Saigon by the French line, Air-Asie, in nine days. Schedules are so arranged that each round trip takes well under a month.

Continuation of this service during 1930 depends upon extension of the privilege of flying over British territory in India, which has not yet been granted. It is hoped, however, that the necessary reciprocal agreements will be secured, and in the meantime the Air-Asie line is developing and extending its routes in Siam and Indo-China. Eventually, it is proposed to establish a line from France to Japan by way of Syria, India, Indo-China and China, and experimental flights with this in mind are already under way.

The Lascoter model designed and built in Australia

Foreign News Briefs

Passengers in and out of Croydon Airport in October of this year numbered 4,342, as compared with 3,046 in October, 1928.

One hundred per cent regularity was maintained during August on the London-Copenhagen-Malmo line operated by K.L.M., and the figure for the eleven services operated by K.L.M. during that month was 99.2 per cent.

Recommendations for the selection of airport sites and preparation of fields have recently been issued in a pamphlet published by the British Air Ministry.

Iris III, a Blackburn 28-passenger, 13-ton all-metal flying boat, has recently been tested by the British Royal Air Force.

Sir Alan Cobham will survey the projected Cape-to-Cairo air route in the Giant Moth plane with which he recently toured England, and which has been purchased by Imperial Airways, Ltd.

A motion picture film has been prepared showing the effect of Hamdley Page wing slots in wind tunnel spinning tests.

A long feature article in a recent issue of *The Aeroplane* indicates the rapid growth of interest in gliders in England.

Cherbourg, France, race track is to be transformed into a flying field.

A series of flights at $2.50 for 15 min. is being offered at Tachikawa Field near Tokio, Japan.

"Pilot assistants" developed in England by the Royal Air Force are said to have kept planes on course without attention from the pilot for distances up to 400 mi.

Membership in the English light plane clubs is said to have increased about 50 per cent since Jan. 1.

Capt. Dieudonne Costes and Maurice Jacques Bellonte arrived at Paris Nov. 21, completing the trip home from Manchuria where they landed Sept. 29 at the conclusion of a flight which established a new non-stop distance record. [The exact distance has not been announced yet.] The airmen completed the trip from Hanoi to Paris in four and a half days, lowering Costes own record for the distance by 6 hr.

The 1930 Belgian war budget provides for purchase of new military planes to an extent of $840,000.

In an interview Jean Borotra, tennis champion, mentioned the fact that he has traveled about 19,000 mi. in the air, having completed 30 trips from Paris to London and back as well as various trips to Belgium, Holland and Scandinavian countries.

A Dutch engineer has patented a new oil engine design, which has horizontal cylinders, no valves and an entirely new design of crank shaft. An aviation engine of this type is being constructed by the Dutch Royal Artillery Works and according to reports Italian constructors have offered to make arrangements for construction on large scale.

Caproni is about to complete his new C.90 all metal biplane, which has a span of 157 ft., length of 90 ft. and height of 37 ft., and wing area 5,920 sq.ft.

Showing New Cabin Model Produced by Nieuport

French Safe Engine Contest Has 33 Entries

PARIS (FRANCE)—The competition for safety devices concerning power units promoted by the "Comité Français de Propagande Aéronautique" received 33 entries, a figure which is considered satisfactory.

Six competitors intend to demonstrate heavy oil engines: Mm. Clerget, Kuntz, Libert Bellem, Jalbert, Barre, Mélot, and some others have entered devices allowing for the use of heavy fuels in aviation engines. The Société Thermodynamique has experimented with a system using gas-oil; M. Rochefort is to exhibit a device allowing for the use of light or heavy fuels with direct injection on a two-stroke engine with opposed pistons; the Société Le Carbone has a special carbureter allowing heavy fuels to be used in ordinary engines, as has M. Colmant. M. Gauchot entered a carbureter for use of paraffin, with special device for starting from cold. Various systems of carbureters with divided atomization are to be seen, as well as several anti-backfire devices, quick-closing fuel cocks, silencers, etc. The experiments with all the devices entered are to begin shortly.

Panama Reports Mail Cost

PANAMA (PANAMA)—A net loss is sustained by the Government of Panama on air mail sent to Nicaragua, Honduras, Curacao, Ecuador and Colombia, according to a report recently made public. Pan American Airways, the contractor, receives $7.50 per pound for this mail, and since the postal rate is $.15 per half ounce, it is estimated that the government loses $.90 on each pound. A loss of $1.80 per pound is sustained on mail to Peru, $2.70 on mail for Chile, and $3.00 for Paraguay, Uruguay and Argentina. The government makes a profit of $1.00 per pound on mail for the United States and for David, Panama.

Nieuport Produces New Cabin Machine

PARIS (FRANCE) — The Nieuport-Delage firm has recently introduced a new light transport cantilever high-wing monoplane, known as type 640. The machine is entirely of wood construction, including wing and fuselage covering. The wing is of high aspect ratio and elliptical plan form, ensuring good efficiency. The structure comprises multiples beams, four of which are specially strengthened. Strong box ribs are provided, about 2 ft. apart.

The fuselage is of box construction, with double covering in the region of the cabin, which measures about 6.4 x 4.25 x 3.75 ft. A luggage compartment is provided. The cabin seats four people. Dual control is provided, as well as parachute installation and fire extinguisher. The tail surfaces are of elliptical form; their construction being similar to that of the wings. The stabilizer setting can be varied on ground between —4 and +2 deg.

The undercarriage is of the divided type, with a shock-absorber of the compressed rubber disks system. The engine unit is readily detachable. The gas tanks are inside the wings and the oil tank is placed directly behind the engine. The plane is intended for any make of air-cooled engine between 230 and 300 hp., such as Lorraine, Salmson, Siddeley, Wright. The general specification is as follows:

Span, 50.4 ft.; length, 31 ft.; height, 10 ft. 6 in. Area, 333 sq.ft.

Weight, empty, with fixed equipment, 2,320 lb.; load, 1,540 lb.; total weight, 3,860 lb. The load is made up as follows: crew and equipment, 262 lb.; fuel, 441 lb.; paying load, 837 lb.

The load factors are: C.P. forward, 7.62; C.P. back, 5.72; nose dive, 2; landing, 6.

The performance is with Lorraine engine (230 hp. at 1,800 r.p.m.) are: high speed at ground level, 127 m.p.h. Cruising speed, 109 m.p.h. Absolute ceiling, 22,100 ft. Climb to 3,281 ft., 3 min. 45 sec.; to 6,562 ft., 8 min.; to 9,742 ft., 13 min. 30 sec.; to 13,123 ft., 20 min. 30 sec.

Range: 498 mi. at cruising speed; 684 mi. at economical speed (82 m.p.h.).

Form French Operating Firm

PARIS (FRANCE) — The International Air Taxi and Light Aviation Company has been organized in France by M. Lawrence Santoni, who before the war was with the British Deperdussin company and since the war with the Italian Savoi-Marchetti Company and the French C.A.M.S. concern.

WHAT OUR *Readers Say*

Personnel and Progress

TO THE EDITOR:

I wish to express a different viewpoint regarding your first editorial in the November 2nd issue entitled "Personnel Now or Progress Later." Inasmuch as I have never been a professor nor a civilian member of any of the Government departments I do not believe the ideas expressed herein can be considered biased.

The orderly progress of American aviation in my opinion will be more rapid if the best men are picked for the best jobs. It seems to me that when selection is based on merit alone and other considerations are of secondary importance, progress is bound to be more rapid. It is of course very trying on the nerves of those responsible for the personnel of a university or Government department to always be working with new material but the industry due to its rapid growth is also confronted with the same problem. The law of supply and demand will eventually iron out these difficulties.

There are times and conditions under which a man might connect with an institution or Government department and after a few months or a year's service be just the individual to take an executive position in the industry. If his training and knowledge are such that he is a picked man to head certain responsible aircraft work, it would be not only a temporary but a permanent loss to aviation for this man to be forced to serve longer with the institution on account of the selfish whim of a superior to hold him. The human element, even in superiors, might tend to keep a man at his post with the inevitable result of a gradual slackening of effort, less incentive for continued research, and a general all around lowering of standards.

Let us not go back to the English method of employment but give the trained engineers, production experts, and operation managers free rein to climb as high on the ladder of progress as their ability warrants. This not only immediately aids the industry but raises the morale and stimulates the minds of all toward continued progress of American aviation.

KARL H. WHITE,
Baltimore, Md.

[The danger suggested in the third paragraph of Mr. White's letter is recognized as a real one, but it is not too much to expect that a man who has once decided to enter the service of the government or of an educational institution should remain there for a reasonable length of time. A period of two or three years was suggested in the editorial to which Mr. White refers. The educational value of work in a government department is in most cases enormous, and many young men enter the service for that very reason. During the first few months of their connection with it they are learning the work and can be of little real value in carrying it on. They should expect to stay at least long enough to render services in some fair proportion to the value of the training that they receive. Mr. White compares the position of industry, and points out that it also is likely to be hampered by shortage of personnel. Admitting that such difficulties frequently arise, there is no comparison with the government departments, for there is no direct limitation upon what an industry can offer in financial inducement. The manufacturer is able to bid for any men that he wants, the government department is not.—Ed.]

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Anonymous Correspondence

[Note to C.E.W. and other anonymous correspondents. We cannot use in these pages any correspondence of which we do not know the source. Nothing will in any case be published over the author's name without his permission, and if there appear to be adequate reasons for withholding the name a nom de plume will be used in print, but the name must be furnished as a guarantee of good faith.—Ed.]

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Airport Ratings

TO THE EDITOR:

A word of caution as to the matter mentioned in editorial in your October 19th issue entitled "Airport Control."

You suggest that the local authorities prohibit the use of any field, commercially, that does not come up to at least a Department D4 rating.

Turn to Dept. Airway Bulletin No. 658 covering Clover Field, at Santa Monica.

The City of Santa Monica originally had 2,800 ft. square for an airfield but since there is never a wind across the field they cut the field to 700 ft. width and put the rest into a golf course.

On my field there is *never* a wind from the north or south. The mountains preclude this. Why, therefore, a cross runway that would *never* be used?

The Dept. had in mind the wide open spaces when it drew up those airport ratings. In California, where the mountains run along the coast, and many of the airports are between the mountains and the sea, cross winds never occur—not for one second of the year. It would be a waste of time and effort to have a runway except for the winds that blow.

Clover Field, one of the most used fields in southern California, cannot take even a D4 rating and yet it is a darn good field.

In my opinion, the Department ratings must be revised, or at least exceptions made for such conditions as we have out here in certain localities.

EARLE OVINGTON,
Santa Barbara, Calif.

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Unwarranted Criticism

TO THE EDITOR:

In the October 26th issue of AVIATION you have reprinted under the caption, "Editorial Comment from the Daily Press," the "Lesson of the Air Meet" as learned by the Boston *Traveler*.

That editorial, while possible representing the opinion of some of those outside the aeronautical industry, is, to my mind, at variance with the opinion, or sentiment, of the professional pilot. In its insinuations, it is in disagreement with the true facts. I speak as a professional transport pilot and as a brother of one of the men killed in the Boston accident to which the Boston *Traveler* refers.

My brother was pilot of that ship, and I dislike the impression conveyed by that editorial to the effect that those persons unfortunately injured or killed during the performance of the National Air Races were conducting themselves in any manner contrary to "such companies as Curtiss and Colonial Air Transport" in their operation "of safe ships, amply powered, thoroughly inspected and sanely flown by competent men."

For example, consider the details of the accident in which my brother, his wife, and his mechanic were killed. He was a licensed transport pilot (No. 269) in the employ of . . .*, was flying a . . .*, also licensed by the Department of Commerce, and owned by . . .* It was powered with a . . .* motor and it was inspected on the day immediately preceeding the fatal accident by the mechanics of . . .*; and at that time it was flown by their test pilot and pronounced O.K.

That my brother flew the ship sanely is attested by the account of the hop. He took off from the Camden, N. J., airport at 8:06 a.m., opened the throttle wide and set the nose of the ship towards Boston, crossing the finish line there at 9:48:30, an elapsed time of 1 hour, 42 minutes and 30 seconds. When

**Names deleted by the Editor.*

crossing the finish line, the ailerons tore off the ship, leaving the operator with no means of lateral control, and subsequently causing the ship to crack-up.

If modern airplanes, licensed, amply powered, thoroughly inspected and sanely flown by competent pilots, haven't got a structure sufficiently strong to withstand a full-open throttle on a cross-country flight, there is something radically at fault with American aeronautical design and/or construction, and the blame for the disaster should not be heaped upon the courageous, powerless, and life-less pilot, who placed implicit confidence in that design and construction.

It is easy (as is often done) to blame the pilot in a fatal crack-up. But why jeer the efforts of chivalrous airmen who have gone crashing down to earth in defective ships, and at the same time admire and glorify those companies whose incapable associates or employees designed, manufactured, powered, and inspected those self-same defective ships?

I think that most of those engaged in the aeronautical profession regard the National Air Races as the supreme expression of the "everyday progress of wise men" in aviation, and as such should be continued because they materially advance the industry.

However, when evidences of retrogression do break into the daily newspapers, those of us who earn our living in the air should be willing and prepared to stand the misfortune, as well as not to stand idly by while others criticise valiant efforts as "the spectacular stunts of the sensationalist."

MARTIN P. DEVEREAUX.

[We are in full agreement with Mr. Devereaux that the editorial reprinted was too broad in its implications. As has been made clear in editorial notes on previous occasions, the editorial selections from the daily press do not in any sense represent our own views, and we sometimes find ourselves in strong disagreement with those which we choose for reprinting. They are presented merely as competent expressions of what certain substantial groups of presumably intelligent non-aeronautical people are thinking about aeronautical development. We who are within the industry cannot ignore the reactions of the general public to our work.—Ed.]

New Volumes
FOR THE SHELVES

Structural Design of Airplanes

STROITELNAYA MECHANIKA AEROPLANA, *by Prof. I. S. Podolsky. Part I Gossudarstvennoye Technicheskoye Izdatyelstvo, Moscow; 1929; Paper 7x11 in., 104 pages; 33 line drawings in text.*

[It is presumed that very few of our readers will be prepared to deal with this Russian volume in the original. The review is presented as an interesting evidence of the extent to which original work in aeronautical engineering is being carried on in Russia, and of the trend of technical thought in the Union of the Soviet Republic. —Ed.]

THIS BOOK which treats of the design of continuous spars is the first part of a general text on the structural design of airplanes, particularly intended for students of the Moscow Military Academy of Aeronautics. The second part will treat of the design of airplane frames, including statically indeterminate types; the third part will treat of the design of airplane fuselages and the fourth will present computations of the moments of inertia of the cross sections of various airplane elements and will also treat of the design of stabilizers, rudders and other airplane parts.

In introducing the first part of his work, the author, who is a civil engineer, frankly states that the text was largely compiled from treatises and papers published in French, English, Italian and German. Entirely original contributions by the author, which have been reproduced in the book, include derivations of exact and elementary 3-moment equations for various cases of loading of continuous spars of trapezoidal wings, also an approximate method for determining the moments of inertia of cross sections of spars from their bending moments, etc.

At the end of the book the author gives ten numerical designs of one identical spar of a Boeing GA2 airplane (the one considered in U. S. Air Service Information Circular No. 493), two of them made on the basis of the author's precise and elementary formulas and the remaining eight on the basis of sundry approximate methods of computation. The comparison is very instructive, showing that the approximate methods may result in deviations as great as minus 57.6 per cent and plus 63.5 per cent from the values of the moments as computed by the author's precise formula.

The work impresses one as very thorough in its theoretical treatment of the subject; its mathematics is slightly more advanced and considerably more copious than that of American works on the same subject. The book demonstrates, in a truly striking manner, what extreme refinements in structural analysis are justified, even required, in practical airplane design. And for this reason it may well become a source of inspiration and encouragement to the theoretically inclined among structural engineers.—ISAAC GUTMAN.

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British Year Book

THE AIR ANNUAL OF THE BRITISH EMPIRE, 1929; *Edited by Squadron Leader C. G. Burge; Gale and Polden, London;* 1929.

THE ONLY OBJECTION to this book, the first aircraft annual limited entirely to British aeronautics, is that none of the succeeding volumes of the series can ever live up to it. This volume edited by Squadron Leader Burge should really be entitled "Post War Aeronautics in the British Empire," and a more generally satisfactory effort I have rarely encountered. The English have a wonderfully fortunate demand for annuals. As mother for the empire and as an important literary source for America, England is naturally called upon for year books and special numbers of its periodicals which can stand the trouble and expense of exporting. In this large, unified land of ours the material that must go into a year book is likely to be as stale as last year's almanac, but to the denizens of South Africa, Australia, India, Canada, and other outlying provinces, an English annual is a never-ending source of information and enjoyment. Who in our field attempts to rival C. G. Grey's "Jane's All the World's Aircraft"? They have correspondingly excellent volumes in almost all their professional and military fields. And this annual of Burge's should be thought well of in England and everywhere else.

In general, the book divides into several main parts: Introductory Greetings and Editorials, The Air Services of the British Empire, Civil Aeronautics, Aerial Photography and Survey, Flying Clubs, the British Aircraft Industry. With each subject treated separately for the British Isles, Canada, Australia, India, South Africa, New Zealand, etc., the arrangement is as exhaustive as it is authoritative. Each article is written by some one especially well qualified for the particular subject.

Of special interest to Americans who have not been able to follow British aeronautics as closely as they might wish, will be the very complete story of the light plane clubs and their complex system of government aid, and the functioning of the Royal Air Force as a separate service on an equal footing with the Army and Navy. The articles on Aviation Insurance are also much to the point for us in view of the close connection between American and English insurance groups. The story of Britain's airlines, with the subsidy systems, the operating statistics, the accident records, future proj-

ects, general aims, is here for the first time worked into one volume. The British are considerably more self-conscious about their aviation than we are, and when they write on the subject their analyses are sometimes more clear and complete than those we get on this side of the Atlantic. The trials and tribulations, the splendid achievements, the advantages and disadvantages of their whole aeronautic system are worked out and discussed; the emphasis is not primarily on promotion.

In general, the references to American aeronautics are rather more than fair. Indeed there seems to be a movement on foot led by C. G. Grey, editor of "The Aeroplane," to use whatever successes we have had over here as a goad to spur their British fellow countrymen to still greater efforts. There are, however, two or three points which ought some day to be made the matter of a formal and weighty debate. The two which stand out are the questions, how much did the Wright Whirlwind derive from the Bristol Jupiter; and the extent of credit deserved by the English for producing their two seater "light planes."

The first question is raised in Mr. Fedden's general article on aircooled engines.

"In the same year (1921) a Bristol Jupiter engine was purchased by the United States Authorities, and this no doubt has had something to do with the subsequent popularity of the nine-cylinder aircooled radial type in the United States." Now it is probably beyond dispute that certain Jupiter features were adopted with advantage in what we can call the middle development period of the Wright, but the particular Jupiter engine mentioned was sent to McCook field for testing of a rather scattered order. In the meantime Mr. Lawrance was already hard at work developing a radial engine which was shortly to receive the whole-hearted backing of the Navy. Whatever borrowing has gone on has probably been in both directions.

The other matter, the light plane supremacy, crops up in about every third article. Grey himself, writing "On Light Aeroplanes," claims "British light aeroplanes are recognized all over the world as being far ahead of those of any other country both in performance and in reliability"; then a few paragraphs later he admits the 4,000 or so single-engined three-place American planes into the "light plane" class. Now I admit that the trend even in this country seems to be toward two-place ships for sport purposes, and that the average English two-seater has a nice take-off and is generally a satisfactory aeroplane, and has folding wings and possibly slots in its favor, but it is hard to admit complete supremacy for a two-place plane with a light aircooled engine which develops 97 hp. having a stock-model top speed of 100 m.p.h. and a landing speed of about 40, when the corresponding American plane carries three people at the same speeds with a 90 hp. water-cooled engine designed about 1912.

Matters of opinion, however, do not detract from the enormous value of the book. No American who lays any claim to being informed on aeronautics generally can afford to be without it.—DANIEL C. SAYRE.

Abstracts AND *Reviews*

Scale Model Tests

WIND TUNNEL TESTS OF SCALE MODELS OF AIRPLANES *(Les Maquettes d'avions au tunnel aerodynamique), by Jean de Lamalatie, in Journal de l'Aviation Francaise, Oct. 15, 1929.*

PROMULGATION of an order requiring wind tunnel tests of a scale model before any new plane design is approved for purchase by the French government, or approved for an airworthiness certificate, has recently aroused a storm of comment and criticism. M. de Lamalatie summarizes the objections under four heads: (1) inaccuracy of wind tunnel tests because of variations in density, turbulence and similar factors; (2) substitution of static for dynamic stability and failure to determine the latter; (3) failure to include the effect of the propeller slipstream in the consideration of aerodynamic qualities; (4) variations in the effect of turbulence due to difference in size between model and the plane itself.

The author, who is frankly a partisan of the new ruling, undertakes to answer these objections in order. He believes that the degree of variation between wind tunnel tests and actual flight conditions is slight enough to be considered unimportant, particularly if a correction for scale effect be applied. Admitting possible differences between static and dynamic stability, he points out that static stability is often an important factor in flying, in the case of abrupt maneuvers, particularly military, and as a result of sudden squalls.

Aside from the possibility of reproducing propeller effects in wind tunnel tests, M. Lamalatie suggests that they may be disregarded since they almost always result in improvement of aerodynamic qualities, and accordingly provide an additional factor of safety. It is also probable that the laws governing the effect of the slipstream will be determined as a result of experiments now under way.

Finally, the possible inherent inaccuracy of these tests, due to variation of aerodynamic quality with size, is largely confuted by the proven practical value of wind tunnel experiments in aircraft design. While the variation may exist in theory, its actual importance does not seem sufficient to warrant abandoning the method or the rule requiring it.

In conclusion, the author admits quite frankly that further study of the relation between results in the laboratory and actual flight tests is highly desirable, and that we should hope for rapid progress in this direction. The queston of determining factors affecting maneuverability, in particular, needs further study, and it is possible that present wind tunnel tests do not take them sufficiently into consideration. Such studies have been made successfully in a few cases, however, and it is largely their more general application which is recommended.

[M. de Lamalatie expresses in very general terms, and very fairly, the major arguments for and against wind tunnel testing as a required part of design routine. The policy adopted by the French Government has occasionally been suggested elsewhere, and our Army Air Corps for some time required the making of a wind-tunnel test on every new design prior to definite settlement. To us it seems quite unnecessary that tests be made on machines of virtually standard type. We feel that the new French requirement goes to an undesirable extreme, and that it would be better to make exhaustive tests (including design and stability) on machines of very novel form or function without requiring anything of the sort on those of more familiar shape.—ED.]

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Aviation and the Argentine

THE PROGRESS OF AVIATION IN THE ARGENTINE, *by Alberto A. Mortz of El Diario, Buenos Ayres, in El Automovil Americano, November, 1929.*

AVIATION IN THE ARGENTINE is at the height of its evolutionary period, says the author of this excellent summary, which does not deal with political factors or give more than cursory mention to the actual competitive situation between European and American interests in Argentine. He treats each as a separate entity, suggesting to the reader that "sympatica" is a peculiarly apt adjective, and as flexible as the most diplomatic can ask.

The formal entry of aviation into the official life of the great South American state took place with the creation of a special air bureau and school in 1912, and the construction of hangars and shops at Palomar, (a

suburb of Buenos Ayres) still the principal military air base. Additional bases are now maintained at Parana and Mendoza. Planes used by the military are the Devoitine (French), Bristol (English), and the Junkers (German). A factory is now constructing Avros at Cordoba. The latter establishment contemplates the construction of Lorraine-Dietrich motors very shortly.

Contrary to the policy of training their own pilots as practised by the Army, the Argentine Navy has turned to other countries, principally, the United States, for instruction of its fliers. As a result, the Navy pilots are generally regarded by government officials as better rounded and more capable, particularly in administrative lines. In 1921 was founded the Naval aviation school at Puerto Belgrano, and in 1925 another was established at Puerto Indio. The original school equipment constituted both land and seaplanes, amphibions, dirigibles, free and captive balloons. Credit for the training policy of the Navy is largely given by Argentinians to the Italian Air Mission of 1915 which laid the groundwork for the present structure. The principal Naval air station is now located at Mar del Plata, situated on the point of land projecting into the Atlantic between Buenos Ayres and Bahia Blanca, and which is also the submarine base. Naval flying equipment includes; Vought, Curtiss and Keystone (American), Fairey, Vickers and Southampton (British), Dornier (German), and Savoie (Italian.)

1922 saw the birth of Argentine's Civil Aviation Bureau, which functions under the overlordship of the Minister of War. Intended at first to encourage and to subsidize flying clubs and to train civilian pilots through such units—a number of the humble Jennys thus found their way below the Equator at that time—the rapid expansion which followed was largely the result of increased interest in airmail, which now absorbs a major part of the Argentinian aviation interest. Numbers of private airdromes loaned their services and facilities to the new bureau and thus became identified in the best European tradition with state-controlled aviation, though Mortz is careful to point out that such ties as were thus formed were mere "courtesy" propositions. The reviewer is not informed as to the reason for this distinction unless it is that the Argentine spokesman wishes to indicate that private aeronautical endeavor has no affiliation with the states' defense program other than that the Civil Aviation Bureau is directed by the War Department. The national budget sets aside an annual 500,000 gold pesos (approximately a half-million dollars), for the fostering of the relationship between private and "public" flying.

This, obviously is not to be regarded as a subsidy, and may be described rather broadly as an "encouragement" fund. The writer mentions Ryan, Curtiss, Consolidated and Waco planes as representing the American beneficiaries of this program which allows for the purchase of a quota of planes yearly for club use.

Graphs show an increase of slightly more than 100 per cent in civil flying in Argentine between the years 1924 and 1928, a modest claim compared with North American reports and one indicating that the situation in South America may have been somewhat exaggerated previously.

With the entry of American, German, British and French capital the situation changed greatly. The British-owned Compania Rio-Platense carrying mail and passengers between Buenos Ayres and Montevideo (using Vickers and de Haviland planes), the German Mision Junkers y Sud America line operating mail and passenger planes through Uruguay and between Cordoba and Rio Cuarto (south of Cordoba), and the New York-Buenos Ayres (American) operating under a special contract with the Civil Bureau of Aviation and best known as the "Nyrba" line, carrying mail and passengers from New York and Washington to Buenos Ayres, and the already imposing network of the Pan-American Airways in the Caribbean and throughout South and Central America, are now giving the Argentine the general aspect of a monster spider-web. The activities of the two latter companies have inspired a furious competition on the part of their European rivals, the latest of which is reputed to be an operating agreement between the great Rohrback manufacturing group and the Lufthansa intended to link Europe and Argentine.

The state-owned Compania General Aeropostal, virtually a subsidiary of the post office, inaugurated service in August of 1928 to carry mails from Buenos Ayres to Toulouse via Africa, and which has since adopted an offspring called La Aeroposta Argentina S.A. (for interstate operations), now operates three lines: Buenos Ayres to Ascuncion; Buenos Ayres to Santiago, and the short Bahia Blanca-Commodoro Rivadavia. There is little in this summary that is new, but it deserves special honor in that it is at least a complete chronology, and one is thus afforded the privilege of studying an important section of the South American aviation panorama.

New Patents

Propulsion Device

1,735,115. FLYING MACHINE. GEORGE D. HIGGINS, Los Angeles, Calif. Filed Aug. 22, 1927. Serial No. 214,587. 8 Claims. (Cl. 244—18.)

THE ORDINARY AIRPLANE is modified by removing the propeller at the front, providing two fans at the sides of the fuselage beneath the wing, and mounting the engine within the fuselage for driving the fans. The front of the fuselage is open, and air is sucked into the interior and then expelled by the fans through openings in surrounding shields. These shields are designed to be rotated by the pilot so that the openings may be positioned to discharge the air rearwardly, downwardly, and forwardly for forward, rearward and upward movement.

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Circular Wing Airplane

1,735,308. AIRPLANE. PAOLA P. WORRELL, Chester, Idaho. Filed Oct. 29, 1927. Serial No. 229,676. 4 Claims. (Cl. 244—14.)

AN AIRPLANE having a full-circle wing. The propeller is mounted on the periphery of the wing, the drive to the propeller from the engine in the fuselage below including a universal joint. The rudder is mounted above the wing, with the pivotal axis at the wing center. The elevator is pivoted on the periphery of the wing. The advantages claimed for this structure are the elimination of tail-spin, nose dive, and side slip, as well as the capacity to continue flight when the power fails.

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Miniature Airplane

1,735,662. MINIATURE AEROPLANE. MANUEL FALCON TREVINO, Crystal City, Tex. Filed Jan. 9, 1928. Serial No. 245,546. 2 Claims. (Cl. 244—29.)

SELF-PROPELLED airplane. A tank of compressed air is employed for driving an air pump which operates a four-cylinder engine to rotate the propeller. The elevators are connected by cables to an engine governor to be operated in a direction to cause the airplane to rise when the engine starts up and to desend when the engine stops.

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Shield for Propellers

1,735,675. PROPELLER GUARD. WILLIAM J. DANCKWART, Corning, Calif. Filed May 7, 1929. Serial No. 361,183. 4 Claims. (Cl. 244—25.)

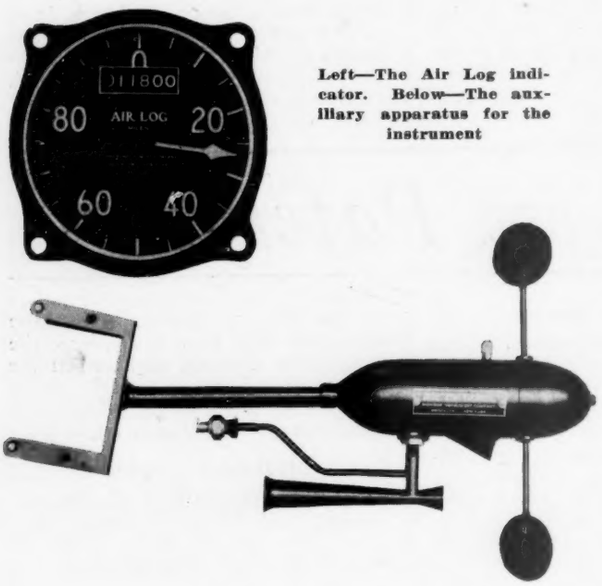
GUARD for preventing contact of the propeller blades with objects. The guard is a cone-shaped wire screen mounted on a forward extension of the propeller shaft. The shaft extension rotates freely in a bearing carried by the guard which is fastened to the fuselage by braces.

THE BUYER'S LOG BOOK

Pioneer Air Log

THE air log, an instrument used for showing the distance traveled by aircraft, is now being manufactured by the Pioneer Instrument Company, 754 Lexington Avenue, Brooklyn, New York. The transmitter of the air log carries a small propeller which revolves as the airplane goes forward, once a mile actuating a valve which transfers vacuum, created by a small Venturi tube, to an indicator on the instrument board, thus adding one mile to the recorded distance.

The indicator has a hand which makes one revolution of the dial for each hundred miles, the hundreds being recorded by a wheel counter. By adding the indication



Left—The Air Log indicator. Below—The auxiliary apparatus for the instrument

of the counter to that of the hand the distance traveled is read. The air log indicates to 999,999 mi. and may also be calibrated to show nautical miles or kilometers. The indicator weighs .7 lb., the transmitter 1.1 lb. and the connecting tubing .06 lb. per ft.

Breuer Electric Paint Sprayer

THE Breuer Electric Mfg. Co., 852 Blackhawk St., Chicago, has recently placed on the market a new electric paint spray machine of the compressor type. It is intended for touch-up work, shading and light finishing and refinishing jobs, as well as semi-production and maintenance industrial painting work.

The new "Tornado" portable electric paint sprayer is built of aluminum castings, equipped with ⅓ hp. General Electric Universal Motor, and develops a pressure of over 35 lb. The compressor unit weighs 7 lb. The gun weighs 2 lb.

The Tornado spray gun is equipped with two tips, one slotted for fan spray and the other, narrow spray, and covering an area of 2 in. to 14 in. A handy adjusting screw controls the amount of paint to be used.

The Tornado, complete, is equipped with quart container, two tips, 20 in. of reinforced rubber covered cord, 8 in. of rubber web covered hose.

TRADE CATALOGS

AERONAUTICAL SUPPLIES. Catalog B for 1929 has just been issued by the Robertson Aircraft Corporation, Division of Universal Aviation Corporation, Lambert, St. Louis Flying Field, Anglum, Mo. This publication, which is known as the Aeronautical Supply Catalog, lists a complete selection of aeronautical equipment as well as interesting tables and descriptive matter on certain standard aeronautical products. A number of standard makes of engines and a listing of parts for several of these engines also is incorporated or embodied in the text. It is 166 pages in length.

BALL BEARINGS. The second edition of the ball bearing manual published by the Gurney Ball Bearing Division, Marlin-Rockwell Corporation, Jamestown, N. Y., has recently been issued and embraces 202 pages of information on the subject of ball bearings. In addition to a number of tables showing characteristics of the various types of ball bearings manufactured by this company, there are a number of cut-away photographs and diagrams showing construction, installation and use of these ball bearings. One section of the manual is devoted to engineering data relative to ball bearings and their application. Included in this section is detailed data required for calculating bearing loads, safety factors, limiting speeds, data regarding the selection of bearing-guides, and a glossary of ball bearing terms.

AERONAUTICAL SUPPLIES AND EQUIPMENT. A 200-page catalog of aeronautical supplies and equipment has recently been published by the Nicholas Beazley Airplane Company, Inc., Marshall, Mo. This booklet, which is designated Catalog G, includes complete parts lists of the Curtiss OX5 and OXX6, Hispano, LeBlond, Wright Whirlwind and Velie engines, power plant equipment, aeronautical books, tools and materials also are included among the articles described. A number of helpful tables are also included in the catalog.

INSTRUMENTS. The instruments manufactured by the Ascania Werke A. G., Berlin Friedenau, Germany, have been listed in a 40-page catalog issued by the American Ascania Corporation, Houston, Texas, distributors of these instruments in America. Among the products featured in this catalog are venturi tubes, a combined altimeter and air-speed indicator having vertical and rectilinear scale, a variometer to measure the speed of climb, a horizon climbing gyroscope and a number of recording instruments. Several types of compasses and a number of interesting and unusual combinations of instruments are included.

Gulfpride Oil

AMERICA'S FINEST AVIATION OIL

GULFPRIDE OILS

provide to the highest extent these desirable features necessary for satisfactory operation of Aviation Motors.

1. **Oil economy—due to their extremely long life; resistance to oxidation and low volatility.**
2. **Lowered maintenance—because of proper lubricating qualities and very low carbon and gum forming characteristics.**
3. **Proper lubrication—a grade for each motor and condition of operation.**
4. **High quality—exhibit minimum change of body under extremes of temperature.**

GULFPRIDE OILS are approved by leading Aviation Engine Builders.

Manufactured for Aviation Engine Lubrication in five grades or body designations:

Gulfpride Oil 75 **Gulfpride Oil 120**
Gulfpride Oil 100 **Gulfpride Oil 150**
Gulfpride Oil 200

GULF REFINING COMPANY

General Offices: **PITTSBURGH, PA.**

District Offices
BOSTON
NEW YORK
PHILADELPHIA
LOUISVILLE
ATLANTA
NEW ORLEANS
HOUSTON

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Refineries
BAYONNE, N. J.
PHILADELPHIA, PA.
PORT ARTHUR, TEX.

GULF

This is one of a series of advertisements directed originally to advertising men in an effort to make industrial advertising more profitable to buyer and seller. It is printed in these pages as an indication to readers that McGraw-Hill publishing standards mean advertising effectiveness as well as editorial virility.

Some serious thoughts from a frivolous discussion of advertising

. our men were discussing advertising around the bridge table. Their discussion as digested here is substantially accurate.

One diamond (*a publicity director*) . . . "You can have your advertising job. Not for me. Advertising's getting too blamed unpopular with the public."

One spade (*an industrial relations investigator*) . . . "Ed, why don't you and I jack up our jobs, go out as crusaders and help recapture the public's faith in advertising?"

One no-trump (*a McGraw-Hill advertising man*) . . . "What are you fellers and the public slamming anyway, advertising principles or advertising practices?"

Pass (*an Industrial Advertising manager*) . . . "Keep it up, you aren't making me feel bad. Most of this present-day criticism of advertising comes from persons who never see Industrial Advertising and of course know nothing about *real* advertising. If there is one place where advertising must be free of bunk, exaggeration and spurious testimonials it is in the industrial field where it is read by engineering minds first and emotional minds last."

THE news, editorial and advertising pages of the advertising journals reflect the serious attention being given the subject discussed more or less lightly above.

Industrial Advertising suffers, of course, with all advertising when advertising is under fire. Yet, by and large, Industrial Advertising copy has followed the sound principles of appeal described on pages 51 to 68 of the McGraw-Hill study, *Industrial Marketing at Work.* Does not the viewpoint of "Pass" suggest that earnest minded advertising men can help *all* advertising by studying Industrial Advertising . . . its use of restraint, facts, tests, logic and bonafide testimonials as opposed to "blue sky"?

McGRAW-HILL PUBLICATIONS

New York Chicago Cleveland Detroit Philadelphia St. Louis
Greenville San Francisco Boston London

F-28

Learn to Fly

Where Sunshine Spends the Winter

Learn to fly without the hazard of icy blasts and biting cold; of snow and sleet. Train at AIRTECH where sunshine spends the winter.

In addition to the main school at San Diego, AIRTECH conducts a winter branch, from November 15 to March 15, at Palm Springs, California. At this foremost winter resort, AIRTECH students learn to fly in America's most perfect winter climate.

At Palm Springs and San Diego, AIRTECH operates Schools of Aviation under Department of Commerce approval. Students now enrolling for this recognized training will be equipped to take their place in aviation when spring brings renewed activity on Eastern Airports.

Write now for «Flight Facts from Lindbergh Field»—and learn aviation where sunshine spends the winter.

Airtech School of Aviation

Department of Commerce Approved
Transport Ground and Flying School

AIRTECH
FIRST IN THE WEST

Lindbergh Field **San Diego, California**

This is one of a series of advertisements directed originally to advertising men in an effort to make industrial advertising more profitable to buyer and seller. It is printed in these pages as an indication to readers that McGraw-Hill publishing standards mean advertising effectiveness as well as editorial virility.

Of course, *this doesn't happen every day*

Recently in Erie, Pa., a McGraw-Hill circulation man visited a plant to get subscriptions and got the surprise of his life. The story may be interesting to those advertising men, who, in selecting advertising mediums, consider not only reader interest but how circulation is built.

Frankly, this Erie plant was not covered as a unit* by certain McGraw-Hill publications. The circulation man was there to find out why. In keeping with McGraw-Hill policy he called at the front office, learned the plant set-up and obtained permission to interview key men.

When, finally, he reported back to the front office the surprise came. Unknown to him an executive had watched him work. This executive greeted him somewhat like this:

"So this is the way McGraw-Hill builds circulation! It interests me because you see we are advertising in your *Engineering News-Record*. We are now going after some mining business and your demonstration here convinces me that your *Coal Age* is a good place for us to advertise."

McGraw-Hill circulation headquarters in New York will gladly explain its principles and practices of circulation building to those who are interested.

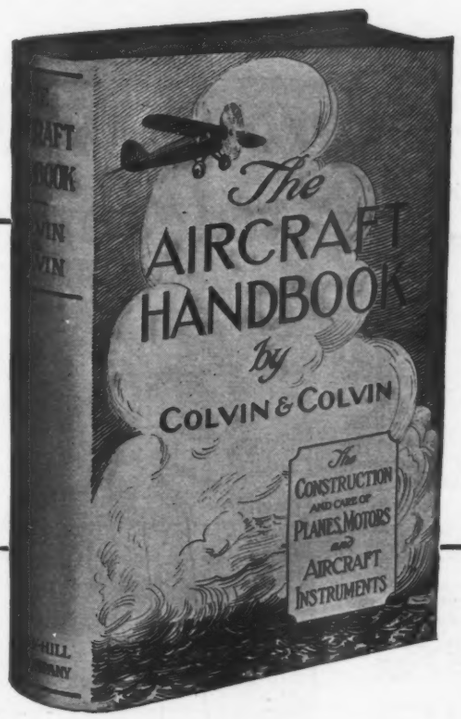
* *Unit Coverage is the aim of McGraw-Hill publications. It means covering the key men of each department or function with the right publication.*

McGRAW-HILL PUBLICATIONS

New York Chicago Cleveland Detroit Philadelphia St. Louis
Greenville San Francisco Boston London

F-21

Modern aircraft design, mechanics and maintenance—in one complete handbook!



No matter whether your job is in the cockpit, the hangar, the factory or the airport, this authoritative aviation guide will give you instantly available information. It is a standard source of reference for the experienced man and a thorough medium of training for the student.

Fourth Edition

AIRCRAFT HANDBOOK

By FRED H. COLVIN, Editor, American Machinist
and HENRY F. COLVIN, Pioneer Instrument Company

690 pages, 5x7½, 350 illustrations, flexible binding, $5.00, postpaid

THE AIRCRAFT HANDBOOK, by reason of its latest complete revision and enlargement, meets a universal need in the aviation world.

To the designer and factory man it gives tested and accurate data on strength of materials, construction methods, rigging, wing shapes, etc. To the mechanic and man in the hangar it offers up-to-the-minute information on motors, accessories, trouble shooting, and servicing. To the student or veteran pilot it gives the air commerce regulations, requirements for various types of licenses, equipment needed, and the latest methods of navigation through instruments such as drift meters, earth inductor compasses, etc. To everyone interested in aviation this book offers a complete nomenclature of terms used together with a concise and comprehensive explanation of aircraft control and management.

Chapter Headings

1. Simple Airplane Theory
2. Types of Airplanes
3. Rigging and Servicing the Plane
4. The Airplane Engine
5. Trouble Shooting for Airplane Engines
6. The Propeller
7. Engine and Plane Accessories
8. Aircraft Instruments
9. Airplane Construction
10. Materials for Aircraft Construction
11. S.A.E. Standards
12. Airships, or Dirigible Balloons
13. Construction of Airports
14. Air Commerce Regulations
15. Nomenclature for Aeronautics

Profusely illustrated with diagrams and photographs

See this book for 10 days FREE

Put the New Aircraft Handbook to an actual working test for 10 days without cost or obligation. Examine it thoroughly before you make your decision whether you will buy it.

Mail the coupon TODAY

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

You may send me on 10 days' approval—**Colvin and Colvin's AIRCRAFT HANDBOOK—Fourth Edition, $5.00, postpaid.** I agree to pay for the book or return it postpaid within 10 days of receipt.

Signed .....
(Please Print)

Address .....

City and State .....

Official Position .....

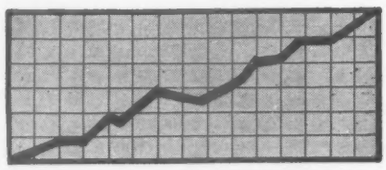
Name of Company .....

(Books sent on approval to retail purchasers in U. S. and Canada only.) **Av. 11-30-29**

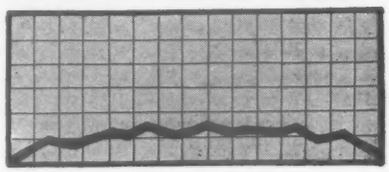
This is one of a series of advertisements directed originally to advertising men in an effort to make industrial advertising more profitable to buyer and seller. It is printed in these pages as an indication to readers that McGraw-Hill publishing standards mean advertising effectiveness as well as editorial virility.

What is wrong with this star salesman?

With the BBK Crane Company he was a phenomenal success.



He went with the XYZ Crane Corporation and was a dismal failure.



The difference is not in the salesman nor in the product but in the nature of the Industrial Advertising backing him. Every industrial salesman cannot be a star, but the best that is in him can be developed if the advertising policy and plan are based on achieving Recognition.

How to build this recognition in ten simple steps is graphically explained in the book, "Industrial Marketing at Work." A copy will be delivered by the nearest McGraw-Hill office to any executive responsible for sales or advertising to industry.

McGRAW-HILL PUBLICATIONS

New York Chicago Cleveland Detroit St. Louis
Philadelphia Greenville San Francisco Boston London

F-13

A Spartan training plane, powered with a Wright Whirlwind motor, fully equipped with instruments and brakes.

A class in parachute instruction. Parachutes are worn during all cross-country and acrobatic flying.

A view of the welding school. All flying and mechanical students receive welding instruction.

One of the Ford planes operated by Southwest Air Fast Express between Tulsa and seven middle-west cities.

SPARTAN TEACHES BY GOVERNMENT STANDARDS . . . MILITARY METHODS

At the Spartan School of Aeronautics military methods prevail to the extent that every student's daily activity is a matter of precise schedule. There is no waste of time, no guesswork, no uncertainty. Training planes are always ready for flight at the appointed minute and students report promptly because they appreciate the effort to give them more than a dollar's worth of instruction for each dollar spent.

Pride . . . and the Spartan Honor System

Spartan students are proud of their school and its business-like methods of operation. Students realize that the Spartan staff is constantly making an earnest effort to give them the best flight and ground school training available and they respect the honor system of discipline which requires neither rules nor regulations. The result is excellent co-operation between students and the school staff.

SPARTAN ADVANTAGES

Spartan offers ten outstanding advantages to the student-pilot: 1—The School is licensed by the U. S. Department of Commerce as both Transport flying and ground school. 2—All flight and ground instructors are government-licensed. 3—A liberal extended tuition payment plan is available to students. 4—Student dormitories and cafe provide excellent living conditions at reasonable cost. 5—Air transportation to Tulsa from Safeway terminals in Ford planes provided without charge to new students. 6—All open cockpit and cabin training planes powered with air-cooled motors including Wright Whirlwind. 7—A scientifically arranged ground course including instruction in theoretical, technical and business subjects. 8—Unusual cross-country flying privileges. 9—Reasonable tuition charges in all courses. 10—An ideal climate for year-round flying.

COURSES

Spartan offers three courses which qualify graduates for license examination in the following grades: Private, Limited Commercial or Transport Pilot.

MECHANIC'S COURSE: A complete, scientifically arranged course of Mechanical instruction, including airplane and motor theory, aeronautical instruments, air commerce rules and regulations, aluminum and steel tubing welding, practical shop work on new production planes and motors.

WELDING COURSE: A practical course in welding, including airplane and motor theory, aluminum and steel welding practice. Our welding equipment is complete to the smallest detail and course is conducted by an experienced welding instructor.

SPARTAN SCHOOL OF AERONAUTICS
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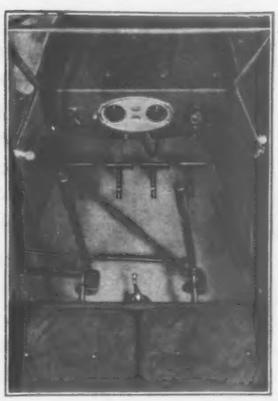

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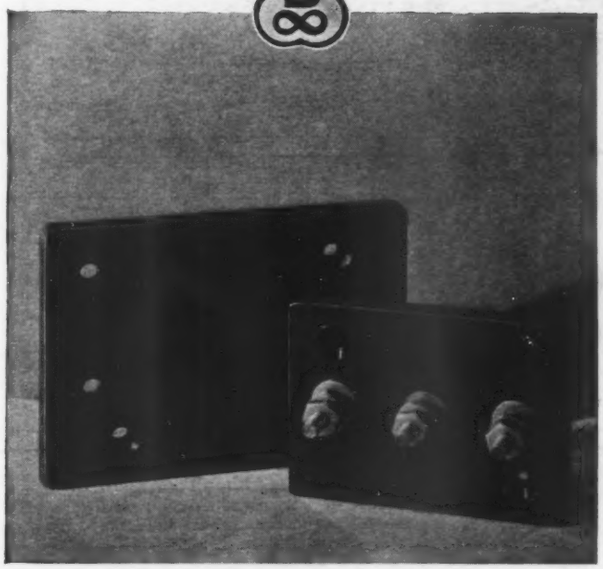

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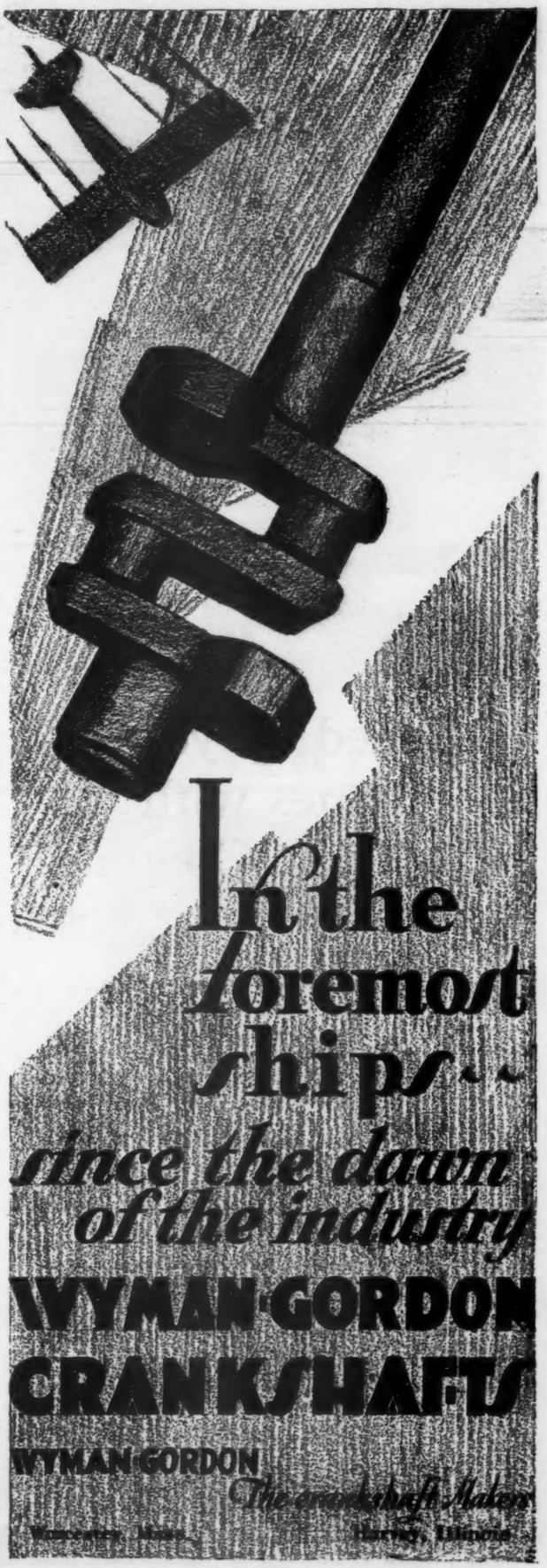

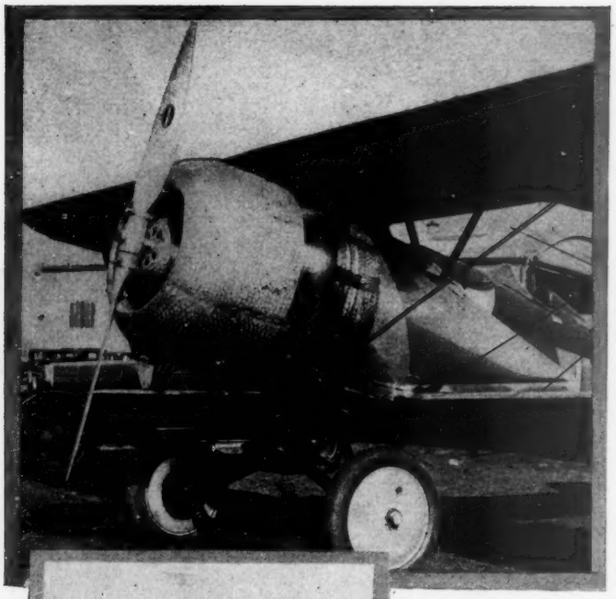

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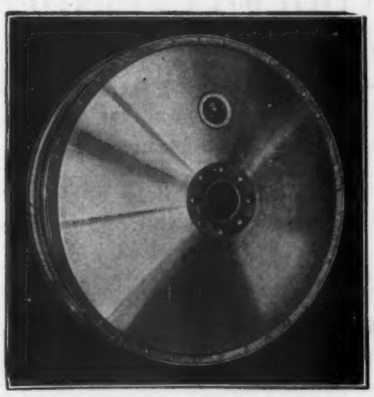

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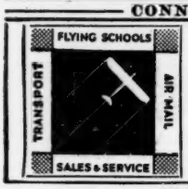

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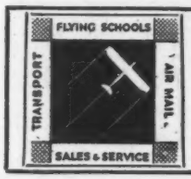

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Rochester Airport—at Rochester, N. Y.

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TIPTON, PA.

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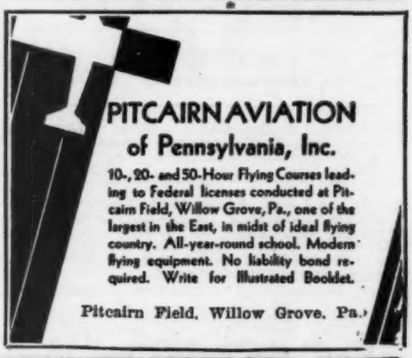
P. O., Tyrone, Pa.

Central, Pa. distributors for Curtiss Flying Service, Kreider-Reisner Aircraft Corp.



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EMPLOYMENT and BUSINESS OPPORTUNITIES—USED and SURPLUS NEW EQUIPMENT

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Positions Wanted, Positions Vacant, and all other classifications, excepting equipment, 10 cents a word, minimum $2.50 an insertion; 15 cents a word if a box number address care of any of our offices is used.

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AIRPLANE motors: Hispano-Suiza A, 150 hp.; Hispano-Suiza E, 180 hp.; Siemans-Halske and Curtiss OX-5 motors, all in excellent condition. OX-5s at especially attractive prices. Write American Eagle Aircraft Corporation, Purchasing Agent, Fairfax Airport, Kansas City, Kansas.

AMERICAN Eagle, 1928, 120 hp. motor, flown 200 hours, always kept in hangar; airspeed, compass, 2 Scintilla magnetos, clock, bank indicator, duals, special landing gear and many other extras. Will sacrifice for $1,500 cash. Ralph Daugler, 441 Willoughby Ave., Brooklyn, N. Y.

AMERICAN Eagle, 1928, single aileron biplane, OXX-6 motor, guaranteed excellent condition throughout; also one newly overhauled guaranteed OXX-6 motor. Very favorable price to cash buyers. Edgar Tobin Aerial Surveys, 1515 Main Avenue, San Antonio, Texas.

BEST OX-5 Curtiss Standard in Indiana. $750. Fly away Frankfort. Frankfort Indiana Aero Club, Inc., Frankfort, Indiana.

BIRD OX-5, Miller action. Never broken up. Fast. First $1,750 takes it. Roosevelt Field, L. I. Hangar No. 21, Freyman.

DUAL American Eagle 1927 biplane, single aileron, completely overhauled, new fabric, completely overhauled OXX6 motor, 100 hours total time, two new type Bosch mags, $2,000 cash. Edgar Tobin Aerial Surveys, 1515 Main Avenue, San Antonio, Texas.

FOR SALE—Comet 7 cylinder, 150 h.p. engine, 60 flying hours, has been completely overhauled. In excellent condition, $1,300 for quick sale. Write Pittsburgh Metal Airplane Co., 1625 Island Avenue, N.S., Pittsburgh, Pa.

FOR SALE—New 1929 American Eagle 3-place biplane with spare motor. Plane was shipped to New York by freight, rigged and test hopped and is ready for delivery. Will sacrifice for $1,800. C. Robinson, 20 Horton Avenue, New Rochelle, N. Y.

New "SEARCHLIGHT" Advertisements

must be received by 10 A.M. Monday to appear in the issue out Saturday.

Address copy to the Searchlight Department

Aviation
Tenth Ave. at 36th St., New York City

FOR SALE

FOR SALE—My Whirlwind Waco, new September 14, 1929, fully equipped for night flying. Special nickel chromed struts and exhaust stacks. Standard steel propeller. New Trypod Type undercarriage with Bendix heel brakes. This ship must be seen to be appreciated and is priced to sell. E. A. Forner, Jackson, Michigan.

FOR SALE—Hisso E Eaglerock special color combination; practically new. Make offer. FS-336, Aviation, Tenth Ave. at 36th St., New York.

FOR SALE—General Aircraft Co. Aristocrat, brand new, flown from factory only. Will sell at great discount and accept OX5 job in trade. Elmer Van Sickle, Municipal Airport, Lansing, Michigan.

FOR SALE or trade. J.N.4H. Licensed, steel landing gear, new production prop. Always kept in hangar. Ready to fly anyplace. $900. Jack Frenzl, 215 N. Morrison St., Appleton, Wis.

The fact that schools advertising in the WHERE TO FLY section of AVIATION have done so over a period of years is one of the best testimonials to the efficiency of this type of advertising.

FOR SALE

FOR SALE—Slightly used Waco 10-OX5. Motor has 15 hours, turns 1,475 on ground, has dual controls, reinforced upper wings, double center section tanks, compass, airspeed. D.H. wheels, baggage compartment and a beautiful paint job. Need cash to pay mortgage on house. Will include 50 hr. flying instruction. Price $2,400. Wire William Hilburg, Bellevue Hospital, Information Bureau, New York City.

FOR SALE: Waco 10 OX-5, licensed. Excellent condition. Wings and fuselage completely re-covered. Motor just overhauled. Like new. Duals and full set instruments. Flown by transport pilot. Always kept in hangar. Bargain $1,800. E. Monroe Osborne, East Hampton, N. Y.

FOR SALE: New Gypsy engine, 95 hp., also Rover inverted engine, 60 hp. Both engines new and in crates. Will accept best offer. W. K. Jay, c/o Northrop Aircraft Corporation, United Airport, Burbank, Calif.

FOR SALE: Cracked Waco 10. Wings completely rebuilt. Tail surfaces O.K. Cheap. 1 K-6 motor with propeller and spares, at a bargain. Wanted two lower wings for long wing Eaglerock. OX-5 motors, cheap. 1 Hisso Model A, cheap. Clarence McArthur, 6305 King St., Tampa, Fla.

FOR SALE: One Irving Parachute. New and in perfect condition. Jumped twice. Price, $300. Clay Saunders, c/o Clarence Saunders, Inc., Memphis, Tenn.

FOR SALE: Real opportunity if taken at once. Simplex Red Arrow monoplane, Kinner K-5 motor, flown two hours, never crashed. O.K. for license. OX-5 motor, run only twenty hours. OXX-6, run ten hours. Also new Irving chute. Must sacrifice for cash. Reply immediately. FS-339, Aviation, Tenth Ave. at 36th St., New York.

HISSO A EAGLEROCK

five months old, forty hours, positively no damages, detachable motor mount Hartzell propeller, dual controls, baggage compartment, cockpit covers, shutters, big wheels. Twenty-four hundred dollars, will consider trade on lighter ship, new production motor.

HARLEY MIETHE
Georgetown, Ill.

FOR SALE

J-5 New Standard

Used two months. Special equipment and paint job. Ideal for barnstorming, cross country or blind flying. 90 gal. tanks. Four passengers and pilot. Heywood starter, brakes, covers, tools. Dual controls.

ARTHUR MENKEN
34 W. 52nd St., New York City

FOR SALE

Flottorp Approved OX5 Propellers With Spinners

12—Brand new $80, for Travel Air, Waco, Swallow, Eaglerock, Curtiss Robin, Bird Wing, Challenger, and American Eagle, price $45 C.O.D. Wire or write.

HOUSEMAN
524 Northwood St., Grand Rapids, Mich.

Detroit Aero Motors Co.

5055-59 Townsend Ave., Detroit, Michigan

MOTORS

2—45 hp. Anzani Motors, $300 each.
1—110 hp., $325.

Low price on new production propellers.

PLANES LISTED FOR SALE

Plane	Motor Type	Price
Robins	OX-5	$2400
Robins	OX-5	2300
Robins	OX-5	2225
Robins	OX-5	3650
Commandaire	Warner	5400
Commandaire	OX-5	3165
Commandaire	OX-5	3340
Travel-Air	OX-5	1300
Fairchild	J-5	4900
Fairchild	Ch.	5800
Cessna	Warner	6075
Cessna	Warner	6300
Cessna	Warner	6970

CURTISS FLYING SERVICE

Valley Stream Airport
Valley Stream, Long Island, N. Y.

Licensed Planes For Sale

Plane	Motor	Price
Great Lakes 2T1	Cirrus	$ 3500
Great Lakes 2T1	Cirrus	3700
Travel-Air	OX5	1800
Travel-Air	OX5	2000
Travel-Air	Kinner	4500
Travel-Air Cabin	J5	7000
Eaglerock	OX5	2000
Ryan Cabin	J5	8000
Ford Trimotor	3J5	31500

Motors

4—OX5, $300 each.
1—Wright J6, 300 hp., 15 hrs.

Ships and motors in excellent condition, located at

WATSON AIRPORT, Inc.
Blue Ash, Ohio

FOR SALE

3 CURTISS SEGAL BOATS

Passed Gov't inspection.

B. KLEIN
60 B'way, Astoria, L. I., N. Y.
Astoria 1096

EXCEPTIONAL OFFER

WACO WHIRLWIND

Ship and motor perfect in every respect. Special paint job; all instruments. Bindex brakes. Olio landing struts. A real bargain at $4,500, or will accept $1,000 cash and $150 per month for quick sale.

FS-343, Aviation,
520 No. Michigan Ave., Chicago, Ill.

FOR SALE

FOR SALE—Salmson 9 cylinder 230 hp. radial engines, Model Z-9, $250 each. These engines are completely dismantled and crated compactly as received. Most of them are new, although some have had approximately fifty hours. All in good shape, complete and serviceable. A very dependable engine and the only opportunity today to acquire an advanced type of engine at this price. Splendid for instruction or experimental purposes. Menasco Motors, Inc., 6718 McKinley Ave., Los Angeles, Calif.

FOR SALE: Three OX-5 motors, rebuilt, and block test guaranteed to be first-class condition, with new parts. Sacrifice $285. Please mail statement. Tri-City Air Service, Inc., St. Charles, Ill.

OX-5 Laird Swallow, 3-place. Newly re-covered. $1,000. Everett Varner, 516 So. Second St., Blackwell, Okla.

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SEARCHLIGHT DEPT.
Tenth Ave. at 36th St., New York
G-17

FOR SALE

MONOCOUPE, A-1 condition, never cracked. 80 hours on ship and motor. Special dual control. Get in your time this winter in a comfortable ship. A real buy at $1,600. Air Transit & Sales Company, Cleveland, O.

FOR SALE at very reasonable prices: Martin mail and passenger plane, A-1 condition, with or without motor. Damaged Waco ten, less motor. K. six motor with spares and propellers. Two J-5 Wright Whirlwinds, Menasco Salmson, nearly new. OX-5 upper crankcase. Wanted for cash or will trade Hisso, four 200 hp. Wright J-5s., also damaged motors and planes. P. O. Box 4111, Tampa, Fla.

THREE OX-5 motors, complete and in good condition, $150 each. Two OX-5 toothpick propellers, $15 each. Two new Berling magnetos, $40 each. Two Wright J-5 motors, used three hours since new, with Heywood air starters and steel propellers, $2,800 each unit. Best satisfactory cash bid received by January first takes one or all. Miller Corporation, New Brunswick Airport, New Brunswick, N. J.

PARACHUTES, new and used, rope ladders for stunt men, etc. Specify weight. Thompson Bros. Balloon and Parachute Co., Aurora, Illinois. Established 1903.

ROLLS ROYCE Phaeton, 1925, mileage 27,000; new tires; newly painted; in A-1 mechanical condition. Will trade for cabin or open airplane. Warner Scarab or Wright engine preferred. Will give or take cash difference. P. D. Smith, 162 No. LeDoux Road, Beverly Hills, Calif.

TRAVEL Air biplane, 125 hp. Siemens-Halske motor, equipped with bank and turn, rate of climb and air speed indicators. Hamilton steel propeller, booster magneto, pioneer compass, and wheel brakes. Price, $3,100. Aeromarine Klemm Hangar, Roosevelt Field, Long Island, N. Y.

WHIRLWIND parts. Factory reconditioned and used J-4 and J-5 parts may be obtained at minimum prices. Descriptive circular upon request. Stout Air Services, Inc. Box 86, Dearborn, Mich.

EQUIPMENT WANTED

CASH for best four-place dual control cabin ship ready for immediate delivery. Dawson-Babcock Aircraft Corp., 1001 Law & Finance Bldg., Pittsburgh, Pa.

CHEAP monocoupe, less motor, or any monocoupe part. W-347, Aviation, 520 No. Michigan Ave., Chicago, Ill.

WANTED: Good used airplane. Whirlwind Waco preferred. O. J. Wilson, Kempton, Ill.

WANTED: A number of new mahogany D.H. Club propellers, seven foot pitch. In writing quote prices. W-344, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRADE

WANT to trade my new Marquette, 1930, Fordor sedan, 2,500 miles; cost $1,260, for good used airplane. Wish to trade even. Will pay some difference. Address Ralph Halstead, c/o Wayne Yorney, Brule, Nebraska.

WILL trade 1929 Essex Challenger sedan, wire wheels, 5,500 miles, and some cash for monocoupe or similar ship. S. Pugh, 8836 Carpenter St., Chicago, Ill.

WILL trade big Marmon roadster for Henderson motor, complete with propeller, or other small airplane engine. Wm. Lain, 617 Baltic St., Brooklyn, N. Y.

POSITIONS VACANT

DRAFTSMEN and designers. We are interested in experienced men with from three to five years' practical experience in aeronautical design and layout, to complete our engineering organization in new plant at Baltimore. The Glenn L. Martin Co., Baltimore, Maryland.

EXPERIENCED stress man on all-metal wing design. Towle Aircraft Co., 261 Stanbin, Detroit, Mich.

Aviation—Employment Available

now in Milwaukee for men who desire to earn while learning aviation. Training is in our shops, classrooms and on the airport. No experience necessary. Write for information without obligation.

AERO CORPORATION OF AMERICA
Employment Department AV.
63 Second St., Milwaukee, Wis.

POSITIONS VACANT

DRAFTSMAN. Experienced layout draftsman on airplane work is wanted by well established, rapidly growing company. P-349, Aviation, Tenth Ave. at 36th St., New York.

PILOTS wanted. L. C. and transport pilots, either full time or part time—can make $100 per week. This is worth investigating. State hours in air, experience as pilot, give license number. P-346, Aviation, 520 No. Michigan Ave., Chicago, Ill.

THOROUGHLY trained man wanted as chief of ground school. Must be able to qualify for all subjects taught by government accredited school. Splendid opportunity for right man. Write giving qualifications and salary desired. P-345, 520 So. Michigan Ave., Chicago, Ill.

POSITIONS WANTED

LICENSED ground instructor desires position with rated or unrated school. Address John Doe, Lambert St. Louis Flying Field, Robertson, Mo.

TRANSPORT pilot, age 25. Sales experience. PW-337, Aviation, Tenth Ave. at 36th St., New York.

WORK WANTED

WANTED: Repairing, rebuilding and overhauling any type airplane. All work by licensed mechanics. Let us estimate on your job. Rummell Air Service Ltd., Findlay, Ohio.

MISCELLANEOUS

SPECIAL prices on graphite and plain valve guises and seats for November and December only. 8 exhaust guides and 8 exhaust valve seats installed, $14. OX-5 and OXX-6 cylinders, $10. Bosch breaker plates to replace Berling, $7. Berling contacts per set, $4. Hartzell propellers fit Waco 10, $40. Illinois Flying Company, 4 West Fourth Street, Sterling, Illinois.

REBUILD your OX5 with removable graphite guides, inserted seats and oversize valve action pins. OX5 and Hisso parts. Write for circular. Heckman Machine Works, 4026 West Lake Street, Chicago, Illinois.

NEW Bosch Booster Magnetos, $20. Winter King flying suits, $24.50. Sheepswool lined, double-breasted, with zippers, $39.50. Propellers, $5 up. Hartzell and Flottorp factory guaranteed. Send for attractive prices. Air Transport Equipment, Garden City, N. Y.

English Aeronautical Engineer

having fifteen years' aeroplane designing and manufacturing experience, including eight years as Chief Engineer to leading British and Canadian companies, desires to join responsible American firm in similar capacity.

PW-348, Aviation
Tenth Ave. at 36th St., New York City

Wanted—CAPITAL

for financing construction of new type aircraft.

Write BO-335, Aviation
Tenth Ave. at 36th St., New York City

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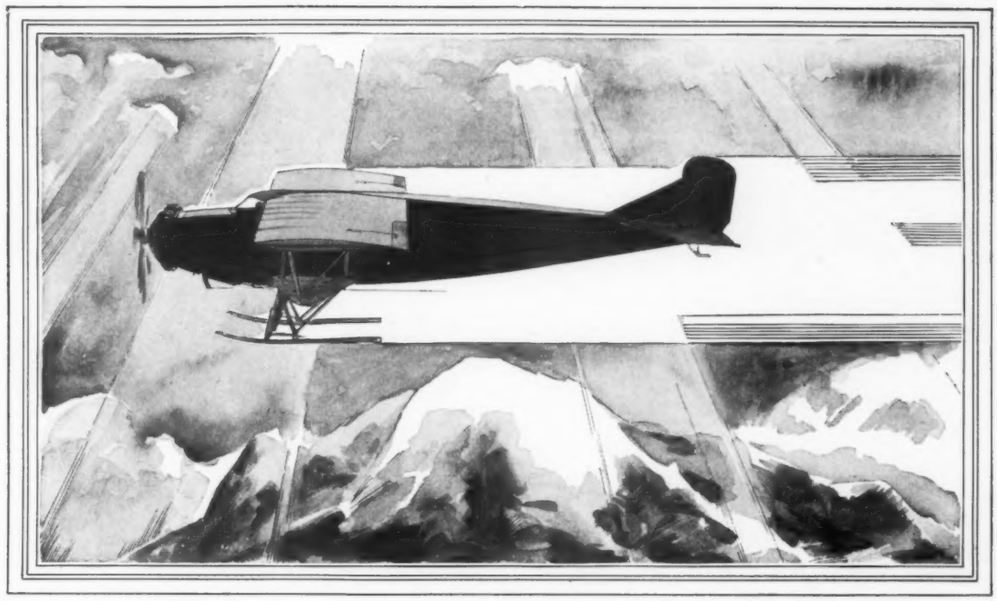
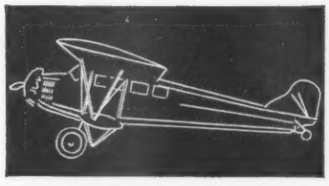


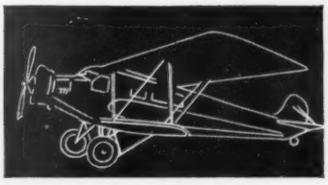
Buhl Airsedan No. CA-6-41*

"Doubles in Brass"



The Buhl Senior Airsedan is an eight-place dual control plane, powered with a Wright Cyclone engine.

The Buhl Sport Airsedan is a three-place plane with dual dep controls powered with either the J-5 or J-6 Wright Whirlwind engine.



The Buhl Standard Airsedan is a six-place, dual control plane, powered with the new J-6 Wright Whirlwind engine.

THAT'S an old expression of the circus lots. The chap who leads the elephants in the parade, does his stuff on the flying rings, then toots industriously in the Silver Cornet Band . . . that chap, they say, "doubles in brass." So does this Buhl Standard Airsedan. It has more jobs . . . and more varied jobs . . . than the most versatile jack of all trades. Passengers or perfumes . . . hairnets or hay . . . mail or macaroni . . . regular trip or special run . . . it's all in the day's work. Clear, snow, or flood . . . the Canadian Northwest is no respecter of persons or of planes . . . she goes through on schedule. She's not only built to perform under any conditions, but is specially equipped to do so. . . standard landing gear for normal use . . . skis for the long, hard winter . . . pontoons when mountains and forests make lakes the only landing fields. Surely such constant, dependable service implies unsurpassed design and craftsmanship.

Buhl Air Sedans
SENIOR · STANDARD · SPORT

* All Buhl Airsedans are given a code number on leaving the factory. Their records are carefully tabulated and are open to your inspection at any time. Proven performance is the finest testimonial to superiority.

BUHL AIRCRAFT COMPANY
MARYSVILLE, MICH.

MAIL THIS COUPON

BUHL AIRCRAFT COMPANY, Marysville, Mich.
Gentlemen: Please send me, free of charge, your booklet "Above the Clouds."

Name_____

Address_____

City & State_____

Port	Line	Fare	SCHEDULE Lv.	SCHEDULE Ar.	RETURN Lv.	RETURN Ar.	Air Miles	Plane	Seats	Motor
ABILENE, TEXAS	Central-Braniff	o-w $ 63 00 r-t 126 00	9 00 (SDS.) At Wichita 6 hrs. 3 55 Ov'T Okla City	12 55	8 50 Via Tulsa or Ov'T Okla. City	6 30 11 30	567 via O. C. 675 via Tulsa	Travel Air 4 000 Fokker F-10-A	6 8 12	Wasp 425 H. P. 2 Wasps 1275 H. P.
ALBUQUERQUE, N. MEX.	Western Air Express	o-w $ 95 00 r-t 190 00	8 30 C T	5 40 MT	12 45 M T.	8 15 C T		Fokker F-10-A	12	3 Wasps 1275 H. P.
AMARILLO, TEXAS	Western Air Express	o-w $ 60 00 r-t 120 00	8 30 C T	5 40 C T	4 35 C T	2 30 C T.		*Fokker F-10-A	12	3 Wasps 1275 H. P.
BARTLESVILLE, OKLA.	Central	o-w $ 30 00 r-t 60 00	9 00 At Wichita 6 hrs. 3 55	(SDS.) 6 55	8 05 3 30	11 30 6 30	276	Travel Air	5	Wasp 425 H. P.
BRECKENRIDGE, TEXAS	Central-Braniff	o-w $ 56 00 r-t 112 00	9 00 At Wichita 6 hrs. 3 55 Ov'T Okla City	(SDS.) 11 45	9 40 Via Tulsa or Ov'T Okla City	6 30 11 30	534 via O. C. 638 via Tulsa	Travel Air 4 000 Hamilton Fairchild	5 6 9	Wasp 425 H. P. Wasp 425 H. P. Wasp 425 H. P.
CHICAGO, ILL.	Universal	o-w $ 50 75 r-t 104 50	12 55	3 55	9 45	5 30	420	Fokker F-10-A	12	3 Wasps 1275 H. P.
CLEVELAND, OHIO	Universal	o-w $ 87 30 r-t 175 00	12 55	7 45	7 30	5 30	740	Fokker F-10-A	12	3 Wasps 1275 H. P.

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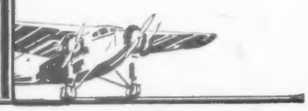
OKLAHOMA CITY, OKLA.	Central Braniff	o-w. $ 33 00 r-t. 66 00	9 00 At Wichita 6 hrs. 3 55	(SDS.) 7 10	7 30	11 30	205	Travel Air	6	Wasp 425 H. P.
OMAHA, NEB.	Universal	o-w $ 42 00 r-t 48 00	10 15	12 05	5 30	3 00	166	Ryan Brougham Fokker Super Universal	4 6	Wasp 425 H. P. Wasp 425 H. P.
PEORIA, ILL.	Universal	o-w $ 45 25 r-t 90 25	12 30 At St. Louis 1½ hrs.	6 00	7 25	3 45 At St. Louis 2 hrs.	281	Ryan Brougham Fokker Super Universal	4 6	Wasp 425 H. P. Wasp 425 H. P.
PONCA CITY, OKLA.	Central	o-w $ 27 50 r-t. 47 00	9 00 At Wichita 6 hrs. 3 55	(SDS.) 6 05	8 30	11 30	230	Travel Air	6	Wasp 425 H. P.
ST. LOUIS, MO.	Universal	o-w $ 32 00 r-t. 60 00	12 30 3 45	3 45 6 00	7 35 11 15	10 05 6 00	235	Ryan Brougham Fokker Super Universal	4 6	Wasp 425 H. P.
ST. PAUL, MINN.	Yellow Cab Airways	o-w. $ 30 00 r-t. 60 00	9 00	5 30	9 00	5 30		Fairchild	6	Wasp 425 H. P.
SAN ANGELO, TEXAS	Central-Braniff	o-w. $ 77 50 r-t. 145 00	9 00 At Wichita 6 hrs. 3 55 3 50 Ov'T Okla City or Tulsa	(SDS.) 3 20	8 00 Via Tulsa or Ov'T Okla. City	6 30 11 30	680	Travel Air Hamilton Fairchild Fokker F-10-A	4 6 9 12	Wasp 425 H. P. Wasp 425 H. P. Wasp 425 H. P. 2 Wasps 1275 H. P.
SALINA, KAS.	U. S. Airways	o-w. $ 14 00 r-t. 25 40	9 00	10 25	2 45	4 10	158	Flamingo	7	Wasp 425 H. P.
SEMINOLE, OKLA. Via S.A.F.E. Way Tulsa (S.D.S.)	Central-Braniff	o-w. $ 41 00 r-t. 82 00	9 00 At Wichita 6 hrs. 3 55 Ov'T Okla City 3 40 or Tulsa	(SDS.) 5 30	9 40	Via Tulsa (S.D.S.) 6 30	365 via O. C. 397 via Tulsa	Travel Air Hamilton Fairchild Fokker F-10-A	4 6 9 12	Wasp 425 H. P. 2 Wasps 1275 H. P.
SPRINGFIELD, ILL.	Universal	o-w. $ 40 75 r-t. 75 25	12 55 At St. Louis 1½ hrs.	5 50	8 15 At St. Louis 2 hrs.	5 45	405	Ryan Brougham Fokker Super Universal	4 6	Wasp 425 H. P.
*Subject to change without notice. For latest information call Air Travel Bureau. Harrison 8100										
SWEETWATER, TEXAS	S.A.F.E. WAY	o-w. $ 60 00 r-t 120 00	9 30	4 40	8 15	2 30		Ford All-Metal	14	3 Wasps 1275 H. P.
TOPEKA, KAS.	U. S. Airways	o-w. $ 7 00 r-t. 14 00	9 00	9 40	5 30	6 30	86	Travel Air	6	Wasp 425 H. P.
TULSA, OKLA.	S.A.F.E. WAY	o-w. $ 22 00 r-t. 44 00	9 30	12 05	12 30	2 30		Ford All-Metal	14	3 Wasps 1275 H. P.
TULSA, OKLA.	Central	o-w. $ 30 00 r-t. 60 00	9 00 At Wichita 6 hrs. 3 55	(SDS.) 6 40	7 30 2 30	11 30 6 30	215	Travel Air	6	Wasp 425 H. P.
WAYNOKA, OKLA.	Transcontinental Air Transport	For Rates Call Air Travel Bureau	3 02	6 26	8 35	11 43		Ford All-Metal	10	3 Wasps 1275 H. P.
WEWOKA, OKLA. Via S.A.F.E. Way Tulsa (S.D.S.)	Central-Braniff	o-w $ 40 00 r-t. 80 00	9 00 At Wichita 6 hrs. 3 55 Ov'T. Okla. City or Tulsa	(SDS.) 9 00	9 00 At Tulsa 6½ hrs.	6 30	397 via O. C. 365 via Tulsa	Travel Air Hamilton Fairchild Fokker F-10-A	4 6 9 12	Wasp 425 H. P. Wasp 425 H. P. Wasp 425 H. P. 2 Wasps 1275 H. P.
WICHITA, KAS.	Transcontinental Air Transport	For Rates Call Air Travel Bureau	3 02	6 26	10 10	11 43	175	Ford All-Metal	10	3 Wasps 1275 H. P.
WICHITA, KAS.	Western Air Express	o-w. $ 25 00 r-t. 50 00	6 30	10 20	8 35	6 35	175	Fokker F-10-A	12	3 Wasps 1275 H. P.
WICHITA, KAS.	Central	o-w. $ 12 50 r-t. 25 00	9 00 3 55	11 00 6 00	8 30 3 30	11 30 6 30	175	Travel Air	6	Wasp 425 H. P.
WICHITA FALLS, TEXAS Via Wichita and Okla City (S.D.S. Through)	S.A.F.E. WAY	o-w. $ 45 00 r-t. 90 00	9 30	3 50	9 45	2 30		Ford All Metal	14	3 Wasps 425 H. P.



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